SEA-TO-SKY HIGHWAY IMPROVEMENT PROJECT

ASSESSMENT REPORT

With Respect to:

Review of the Application for an Environmental Assessment Certificate
Pursuant to the *Environmental Assessment Act*, S.B.C. 2002, c. 43
And
The Requirements of a Screening Report Pursuant to the
Canadian Environmental Assessment Act, S.C.1992, c. 37 as amended

Prepared by

Environmental Assessment Office

May 2004

BRITISH
COLUMBIA

SEA-TO-SKY HIGHWAY IMPROVEMENT PROJECT ASSESSMENT REPORT

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LIST OF ACRONYMS

AiA	Archaeological Impact Assessment
AIUS	Aboriginal Interest and Use Studies
ARD	Acid Rock Drainage
BCAIA	British Columbia Archaeological Impact Assessment Guidelines
BCEAA	British Columbia *Environmental Assessment Act*
BCWQG	BC Water Quality Guidelines
BMP	Best Management Practices
BTWG	Biophysical/Technical Working Group
CACs	Criteria Air Contaminants
CAG	Community Advisory Group
CEAA	*Canadian Environmental Assessment Act*
CEQG	Canadian Environmental Quality Guidelines
CMHC	Canada Mortgage and Housing Corporation
CMT	Culturally Modified Tree(s)
CSD	Context Sensitive Design
CWS	Canadian Wildlife Service
dB	Decibel
DBFO	Design-Build- Finance-Operate
DFO	Fisheries and Oceans Canada
DoS	District of Squamish
EAO	Environmental Assessment Office
EC	Environment Canada
EMP	Environmental Management Plan
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GVRD	Greater Vancouver Regional District
HAZMAT	Hazardous Materials Contractors
HC	Health Canada
HOV	High Occupancy Vehicle
INAC	Indian and Northern Affairs Canada
IR	Indian Reserve Land
Ldn	Day-Night Average Noise Level
Leq	Equivalent Sound Level
LRSP	Livable Region Strategic Plan
MEM	Ministry of Energy and Mines
ML	Metal Leaching
MoT	Ministry of Transportation
MSRM	Ministry of Sustainable Resource Management
NO_x	Nitrogen oxides
NWPD	Navigable Waters Protection Division
PAG	Potentially Acid Generating Rock
PEP	Provincial Emergency Program
RCLH	Rubble Creek Land Hazard (formerly the Garibaldi Civil Defense Zone)
RMOW	Resort Municipality of Whistler

LIST OF ACRONYMS (Cont.)

SEWG	Socio-Economic Working Group
SLFN	Squamish and Lil̓wat First Nations
SLRD	Squamish-Lilloet Regional District
TDM	Transportation Demand Management
TC	Transport Canada
TLC	Technical Liaison Committee
TWFN	Tsleil-Waututh First Nation
VEC	Valued Ecosystem Component
VOC	Volatile Organic Compound
WLAP	Ministry of Water Land and Air Protection
WP	Work Package

EXECUTIVE SUMMARY

Background

The Sea-to-Sky Highway Improvement Project (Project) extends from immediately east of Nelson Creek canyon in the District of West Vancouver to Function Junction in Whistler, a distance of approximately 95 kilometres (km). The Project excludes the section of highway between Culliton Creek and Cheakamus Canyon because highway improvements in this area were approved and work underway when the Ministry of Transportation (MoT) applied for an environmental assessment certificate for the Project in August 2003.

The communities of the Howe Sound area (West Vancouver, Lions Bay, Squamish), the Resort Municipality of Whistler, Pemberton and Mount Currie are all linked by the Sea-to-Sky Highway 99 Corridor. The highway requires upgrades to address current deficiencies in safety, reliability and mobility, and to serve future travel needs, including transportation demands during the 2010 Winter Olympics.

For the purposes of the environmental assessment review the scope of the Project included:

- the works necessary to improve the existing highway;
- methods and locations for disposal of rock, surplus material and other waste;
- construction, use and maintenance of new ancillary facilities such as equipment storage and marshalling areas, barge access areas and gravel borrow areas;
- ancillary road system modifications adjacent to the Sea-to-Sky Highway associated with construction, operation and maintenance of the Project;
- all off-site facilities such as construction camps or other infrastructure services associated with and necessitated by implementation of the Project;
- any off-site environmental compensation works associated with and necessitated by implementation of the Project;
- all activities associated with the construction, operation and maintenance of the upgraded highway, including ongoing maintenance and traffic management; and
- any other physical works or activities which, in the view of the Environmental Assessment Office (EAO), form an integral part of the Project.

The EAO and federal Responsible Authorities defined the scope of the environmental assessment in Terms of Reference issued to the MoT on June 24, 2003 and has considered the potential environmental, economic, social, heritage and health effects of the Project.

In the Sea-to-Sky Highway Improvement Project Application (Application) the MoT originally proposed two split grade options for the section of the alignment between Horseshoe Bay and Sunset Beach:

- two new northbound lanes on the bench up-slope of the existing highway from Eagle Ridge Interchange (on Highway 1) to Pasco Road with upgrading of the existing two-lane Highway 99 for use by southbound traffic from Pasco Road to Marine Drive; or
- two new northbound lanes from immediately east of Nelson Creek canyon on Highway 1 to Pasco Road on the bench up-slope of the existing highway, approximately 1 km of which would be a tunnel at the south end, with upgrading of the existing Highway 99 to be used for two lanes of southbound traffic.

In April 2004, the MoT replaced these split grade alignments with two revised options for the section alignment between Horseshoe Bay and Sunset Beach: a four-lane overland route (known as Option B) and a two lane, two way tunnel and partial overland option (known as Option D). With Option B the existing Highway 99 between Horseshoe Bay and Sunset Beach remains a two-lane, two-way alignment for local traffic. With Option D, the two-lane tunnel will operate in conjunction with the existing two-lane Highway 99, with traffic split between the two routes to provide adequate traffic capacity. The existing highway will be upgraded from Marine Drive to south of Pasco Road.

Federal Harmonization

The Project is subject to federal review (screening level assessment) under the *Canadian Environmental Assessment Act* (CEAA) as it requires a federal authorization under legislation contained in the CEAA Law List Regulations.

First Nation Interests

The entire Project study area is within the asserted traditional territory of the Squamish Nation. This study area is overlapped to the north by the asserted traditional territory of the Lil̓wat Nation (approximately between Rubble Creek and Function Junction). The southern end of the alignment between Horseshoe Bay and Lions Bay is marginally within the asserted traditional territories of the Tsleil-Waututh Nation and the Musqueam Indian Band.

The Squamish and Lil̓wat Nations and/or their technical consultant took part in working group meetings during pre-application and during the Application review. The MoT and the Squamish and Lil̓wat Nations agreed on various Project related Protocols, MOUs and funding agreements. Tsleil-Waututh Nation participation in the pre-application phase of the environmental assessment began in the spring of 2003. The MoT and Tsleil-Waututh Nation finalized a Protocol Agreement in May 2003 that provided the framework for the Tsleil-Waututh to participate in the EA review process. The Squamish and Lil̓wat Nations provided a joint submission on the Application and the Tsleil-Waututh First Nation also provided written comments on the Application.

The Squamish and Lil̓wat are concerned that the assessment of potential cumulative effects from the Project, as required by the federal CEAA,is incomplete because it did not consider the impacts of induced growth, attendant development and its impacts on First Nations or the full scope of all existing development in the Sea-to-Sky corridor including the existing highway. The Canadian Environmental Assessment Agency, on behalf of the federal Responsible Authorities responded to the Squamish and Lil̓wat to advise that CEAA does not require assessment of induced growth unless the type of projects, the area of impact and the environmental components that would be affected could reasonably be identified and are likely to interact with the Project.

Public Comments

The MoT undertook a comprehensive public consultation program prior to, and during, the review of the Application. The EAO also conducted a fifty-nine day public comment period on the Application from August 20 to October 17, 2003. Residents of the District of West Vancouver and the Village of Lions Bay provided 55 of the 105 written submissions to the EAO during the public comment period.

West Vancouver residents expressed concerns about potential increases to traffic at the Caulfield interchange, impacts to emergency response times, and issues of local access and mobility from the proposed split grade alignments originally proposed in the Application. In response to these and other design issues, the MoT initiated further consultation in the District of West Vancouver in January 2004. The MoT conducted two open houses in the West Vancouver area on February 16 and 22, 2004 to present revised options for the preliminary alignment between Horseshoe Bay and Sunset Beach and met with twelve stakeholder groups and service providers in the community. The MoT reported the results of these consultations in the *Sea-to-Sky Highway Improvement Project Clarification Report – Horseshoe Bay to Sunset Beach (West Vancouver Segment)*, April 2004 (West Vancouver Clarification Report) and presented Option B and Option D for certification.

In the Village of Lions Bay, residents were concerned about noise and impacts to safety and connectivity from the four-lane alignment proposed by the MoT in its Application and from the MoT's proposal to pave a section of the BC Rail line for use as a traffic detour during Project construction in the Lions Bay area. In January 2004 the MoT initiated additional consultations with the Village of Lions Bay that included an open house and public meeting on February 28, 2004 to present revised options for the preliminary alignment through the community (Work Package 3A). The results of these consultations are reported in the *Sea-to-Sky Highway Improvement Project Clarification Report – Village of Lions Bay*, March 2004 (Lions Bay Clarification Report). Based on additional consultation with the community of Lions Bay since March 2004, the MoT has since decided to proceed to preliminary design with the four lane divided highway option only and has communicated this to the Village of Lions Bay in a letter to the Mayor and Council on May 7, 2004.

Working Group Review of the Application

The EAO created a Biophysical Technical Working Group and a Socio-Economic Working Group to provide technical analysis and advice during the review of the Application and subsequent review of the West Vancouver and Lions Bay Clarification Reports. The working groups benefited from the participation of representatives from federal government departments, provincial ministries, local governments in the Sea-to-Sky corridor and representatives from the Squamish, Lil'wat and the Tsleil-Waututh First Nations.

Summary of Key Review Issues

Project Design

The primary design issue discussed during the review was the proposed alignment options between Horseshoe Bay and Sunset Beach. The District of West Vancouver Council favours a tunnel option and is concerned about the potential environmental impacts of the four lane overland route (Option B) relative to the proposed option for a two lane, two way tunnel (Option D). During the environmental assessment, the District of West Vancouver commented that prior to the development of Option B and Option D, the MoT committed to investigate a tunnel of between 1.0 and 1.4 km in length, whereas, the length of Option D as currently proposed by the MoT for comparative purposes with Option B is approximately 1 km. The District observes that if the tunnel proposed in Option D were extended by 400 metres it would increase the environmental benefit of the tunnel substantively. The MoT responded that it had investigated many options including longer tunnels to assess trade-offs between such factors as property requirements, safety performance, environmental impacts and cost. The MoT estimates that extending the tunnel from 1.0 to 1.4 km would have an additional net cost of $10-15 million while making the grade steeper and adversely affecting the safety performance.

The District of West Vancouver has concluded that Option B and Option D (as currently designed) have the potential for significant adverse environmental effects. This conclusion is not shared by the federal and provincial representatives to the working groups, who are satisfied that neither Option B nor Option D are likely to cause significant adverse effects.

Community Noise Impacts

The Project does have the potential for increased noise near some residential areas during the construction phase because of the volume of construction activity scheduled for nighttime hours and the noise associated with this type of activity. The MoT predicts that these levels of construction noise will temporarily inconvenience some residents. The MoT will develop a Noise Control and Mitigation Plan and schedule the noisiest construction activities for daytime hours where feasible. The MoT will also promote good communication with local communities to help manage construction noise impacts.

The working groups also considered the potential for impacts from increased noise from Project operations. The Village of Lions Bay expressed extensive community concern about potential noise impacts to their community. These concerns have been further addressed and the MoT has committed to working with the Village of Lions Bay to reduce current highway noise by 4-5 decibels and will make best efforts to incorporate other noise mitigation measures, which could result in a further 5 decibel reduction.

The Squamish Nation is concerned about potential noise impacts from Project operation to the community living on IR#24. The MoT has committed to further analysis of noise impacts and mitigation measures on IR#24 during the detailed design phase when the physical characteristics of the alignment are better known. This analysis will be done in cooperation with the Squamish Nation.

Geochemical Issues

The Project will include extensive rock cuts and primarily between Sunset Beach and Lions Bay and will generate waste rock that is potentially acid generating material (PAG) or metal leaching (ML) and will require careful disposal. The MoT will use the Britannia Mine Site as the primary method for disposal of PAG/ML materials and may also use ocean disposal for some PAG material, subject to permit from Environment Canada. The MoT will also, as part of its environmental management planning, adopt a proactive approach to the management of PAG rock cut surfaces and of rock cuts which may have the potential for metal leaching in the future. The plan will be reviewed by the Ministry of Energy and Mines and will include water control measures where feasible.

Water Quality

Contamination of a water source can result from point and non-point sources created during Project construction (e.g. blasting, siltation, spills) or during Project operations (deposit of substances on the road surface from vehicle tires and exhaust and from de-icing chemicals and winter abrasives). Precipitation eventually flushes these substances from the road surface into ditches and streams and can result in fluctuations in water quality. The MoT will implement a three-component Water Quality Monitoring Program including: water quality audit and performance monitoring; water quality sampling and analysis of runoff from PAG/ML rock cuts; and water quality field sampling monitoring protocol.

Fisheries and Aquatics

To the extent possible, the MoT has avoided impacts to aquatic habitat from the proposed highway alignment with the exception of seven sites identified in the Application where unavoidable impacts to fish habitat will occur. The MoT proposes to develop and implement a Fish and Fish Habitat Mitigation Compensation Plan to achieve no net loss of the productive capacity of fish habitat. The MoT also proposes to offset impacts to amphibian habitat through opportunities provided by fish habitat compensation works or through other separate enhancement initiatives. These initiatives will be further discussed with Fisheries and Oceans Canada (DFO) during the final design phase and the development of compensation measures for impacts to fish and fish habitat.

Conclusions

The EAO and federal Responsible Authorities are satisfied that:

- the Application adequately identified and assessed the potential significant adverse environmental, economic, social, heritage and health effects of the Project;
- public and First Nations consultation, and the distribution of information about the Project have been adequately carried out by the MoT;
- issues identified by the public, First Nations, federal, provincial and local government agencies, that are within the scope of the EA, were adequately addressed by the MoT during the review of the Application; and,
- practical means have been identified to prevent or reduce to an acceptable level any potential adverse effects of the Project.

1. INTRODUCTION

The communities of the Howe Sound area (West Vancouver, Lions Bay, Squamish), the Resort Municipality of Whistler, Pemberton and Mount Currie are all linked by the Sea-to-Sky Highway 99 Corridor. The highway requires upgrades to address current deficiencies in safety, reliability and mobility, and to serve future travel needs, including transportation demands during the 2010 Winter Olympics. These upgrades constitute the proposed Sea-to-Sky Highway Improvement Project (Project).

Accident rates along this predominantly two-lane highway are substantially higher than the provincial average for comparable roads and, on average, are more severe than the overall average for the province. Between Horseshoe Bay and Whistler there were 27 road related fatalities between 1996 and 2000. Improvements in the corridor are needed to bring the accident rates down to the provincial average for similar classes/types of highways.

Travel along the highway is subject to recurring delays from activities such as minor construction works, rock scaling, rock falls, debris flows and other natural events. The MoT predicts that improvements to the corridor will reduce travel time between Horseshoe Bay and Whistler compared to travel times in future years if no highway improvements are made. Upgrades are also necessary to meet the requirements to host the Vancouver/Whistler 2010 Winter Olympics.

The MoT plans to use a Design-Build-Finance-Operate (DBFO) procurement model for the Project.[1] The number of contracts could range from one overall contract for the entire alignment to separate contracts for each major construction segment. The procurement strategy and ownership/management framework will meet the overall fiscal requirements of the Province of British Columbia and deliver the Project on schedule.

2. PROJECT DESCRIPTION

The Project, which begins near Horseshoe Bay and ends at Function Junction near Whistler (Figure 1), may be carried out in stages or sections known as Work Packages (WP). Volume 1, Section A of the Sea-to-Sky Highway Improvement Project Application (Application) outlines a proposed base case construction schedule. The work required for the Project is described in detail in Volume 1, Section B of the Application. Volume 3, Section A5 of the Application provides an overview of the construction program. Table 1 shows the current preliminary Project construction schedule and may be subject to change after the DBFO contractor is selected.

The work from Culliton Creek to Cheakamus Canyon (North) was underway before the Project was declared reviewable under the British Columbia *Environmental Assessment Act* (BCEAA) and is not part of the current environmental assessment.

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[1] Through a request for proposals, the MoT will grant a concession to a third party to design, construct, operate, maintain and finance the highway in exchange for a defined stream of revenues. The MoT notes in the Application that motorist-paid tolls on the highway are not being considered for the Project.

Figure 1 – Preliminary Alignment

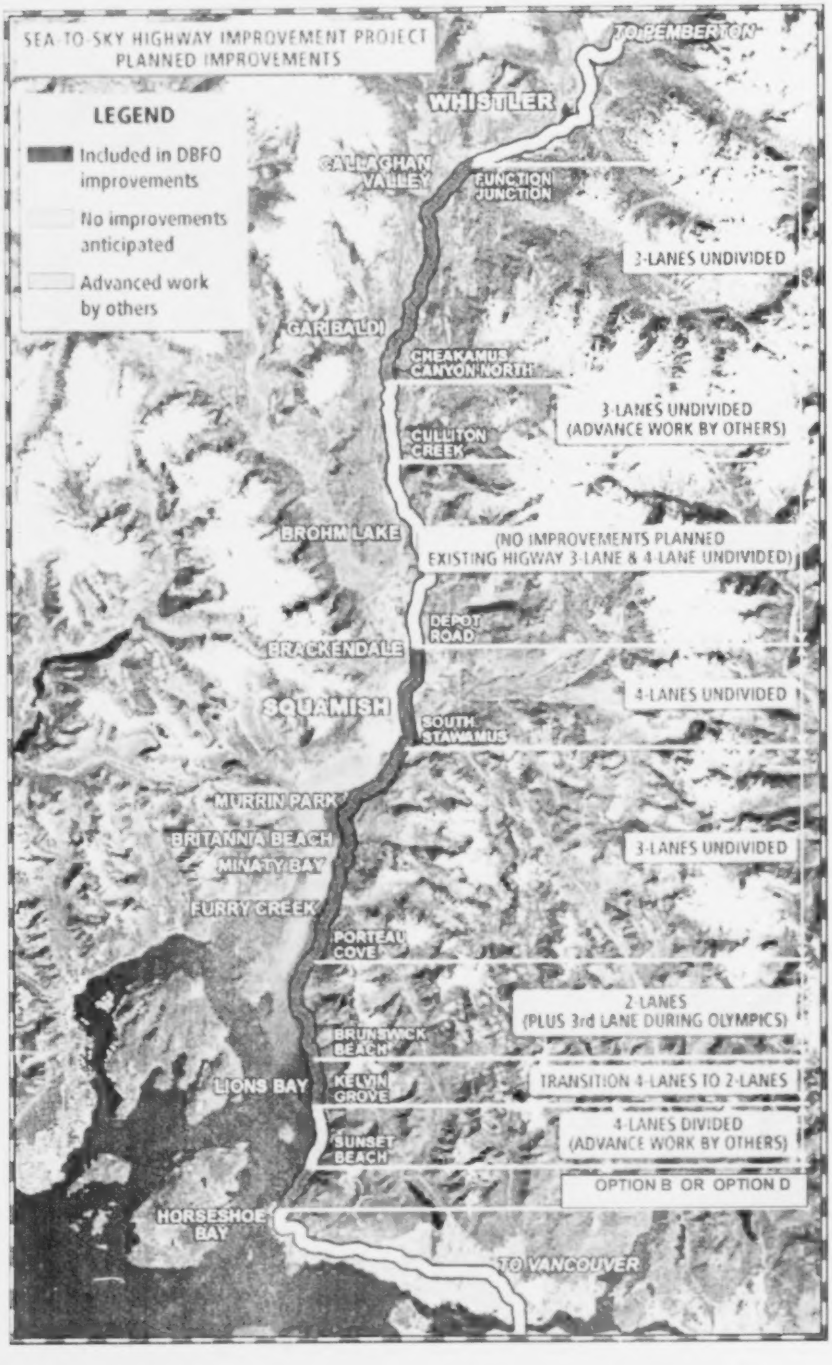
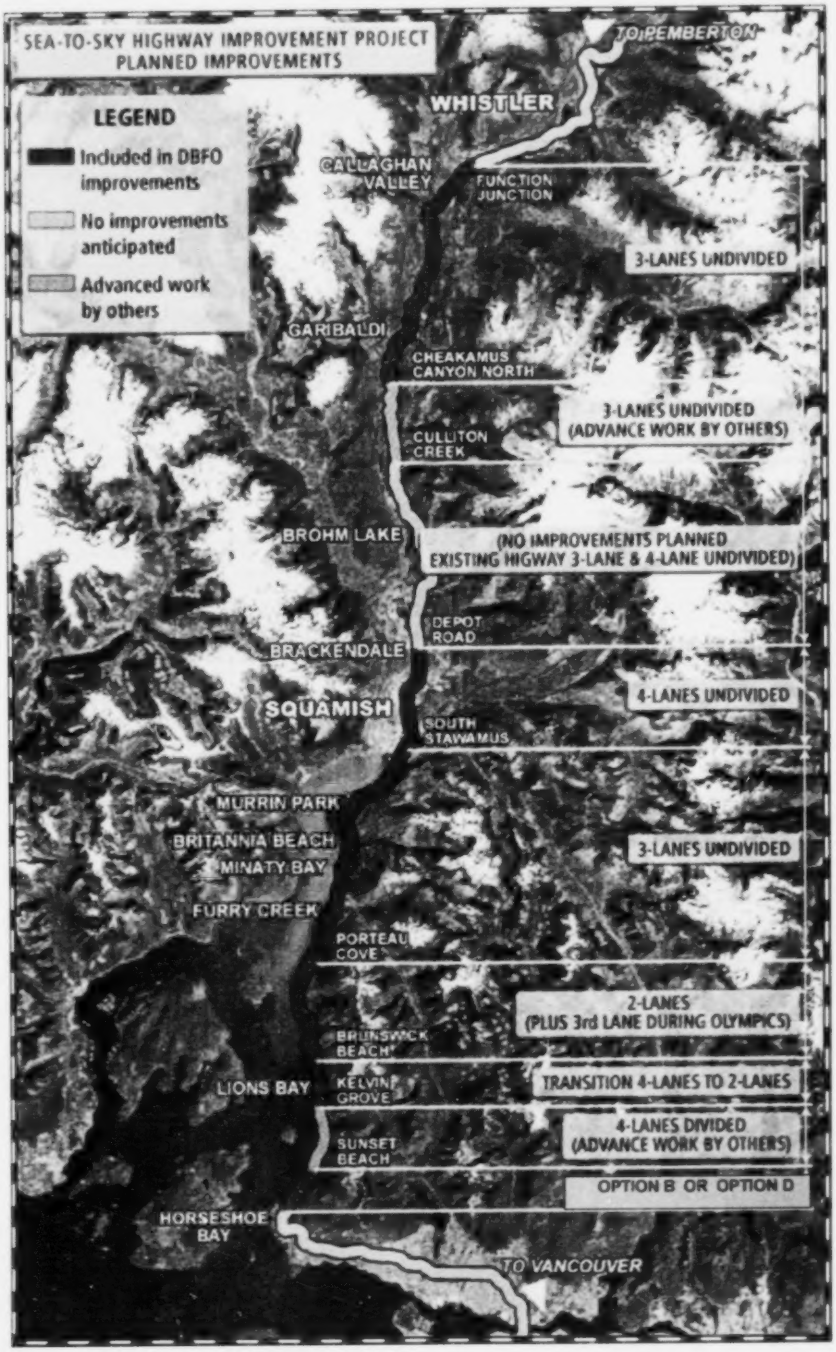

SEA-TO-SKY HIGHWAY IMPROVEMENT PROJECT
PLANNED IMPROVEMENTS
LEGEND
Included in DBFO improvements
No improvements anticipated
Advanced work by others
TO PEMBERTON
WHISTLER
CALLAGHAN VALLEY
FUNCTION JUNCTION
3-LANES UNDIVIDED
GARIBALDI
CHEAKAMUS CANYON NORTH
3-LANES UNDIVIDED (ADVANCE WORK BY OTHERS)
CULLITON CREEK
BROHM LAKE
(NO IMPROVEMENTS PLANNED EXISTING HIGWAY 3-LANE & 4-LANE UNDIVIDED)
DEPOT ROAD
BRACKENDALE
SQUAMISH
4-LANES UNDIVIDED
SOUTH STAWAMUS
MURRIN PARK
BRITANNIA BEACH
MINATY BAY
3-LANES UNDIVIDED
FURRY CREEK
PORTEAU COVE
2-LANES (PLUS 3rd LANE DURING OLYMPICS)
BRUNSWICK BEACH
LIONS BAY
KELVIN GROVE
TRANSITION 4-LANES TO 2-LANES
4-LANES DIVIDED (ADVANCE WORK BY OTHERS)
SUNSET BEACH
OPTION B OR OPTION D
HORSESHOE BAY
TO VANCOUVER

Figure 1 – Preliminary Alignment


SEA-TO-SKY HIGHWAY IMPROVEMENT PROJECT
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No improvements anticipated
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GARIBALDI
CHEAKAMUS CANYON NORTH
3-LANES UNDIVIDED (ADVANCE WORK BY OTHERS)
CULLITON CREEK
BROHM LAKE
(NO IMPROVEMENTS PLANNED EXISTING HIGWAY 3-LANE & 4-LANE UNDIVIDED)
DEPOT ROAD
BRACKENDALE
4-LANES UNDIVIDED
SQUAMISH
SOUTH STAWAMUS
MURRIN PARK
BRITANNIA BEACH
MINATY BAY
3-LANES UNDIVIDED
FURRY CREEK
PORTEAU COVE
2-LANES (PLUS 3rd LANE DURING OLYMPICS)
BRUNSWICK BEACH
LIONS BAY
KELVIN GROVE
TRANSITION 4-LANES TO 2-LANES
4-LANES DIVIDED (ADVANCE WORK BY OTHERS)
SUNSET BEACH
OPTION B OR OPTION D
HORSESHOE BAY
TO VANCOUVER

Table 1 – Work Packages and Locations

Work Package	Approximate Location	Begin	End
WP 1	Horseshoe Bay	2005	2008
WP 2	Sunset Beach to Lions Bay	2004	2007
WP 3A	Urban Lions Bay	2007	2008
WP 3	Lions Bay to Furry Creek	2004	2009
WP 4	Furry Creek to South Stawamus	2007	2008
WP 5	South Stawamus to Depot Road	2005	2007
WP 6	Depot Road to Culliton Creek	2005	2008
WP 7	Culliton Creek to Cheakamus Canyon (North)	2003	2004
WP 8	Cheakamus Canyon (North) to Function Junction	2004	2008

The MoT has designed the construction schedule to avoid road closures due to construction during December, January and February. Minor, intermittent delays may occur at any time of the year. Delays between fifteen to thirty minutes in length are limited to the period from March to November. The general works for the Project are summarized below. While the Project includes improvements to existing access road connections and consolidation of some accesses, no new access roads are proposed as part of the Project.

WP1 - Horseshoe Bay to Sunset Beach
The options for the preliminary alignment between Horseshoe Bay and Sunset Beach are described in the *Sea-to-Sky Highway Improvement Project Clarification Report – Horseshoe Bay to Sunset Beach* (West Vancouver Segment),April 2004 (West Vancouver Clarification Report) and replace the options presented in the original Application document. The MoT proposes two options for certification, known as Option B and Option D.

Option B is an overland route with four new lanes up-slope from the existing Highway 99 corridor. The existing highway would then serve only local and ferry traffic. The MoT indicates that the long-term capacity and safety of Option B are superior to all other options (ref: Accident Cost (PV) Table on page 12 of West Vancouver Clarification Report). No highway improvements are necessary on the existing highway between Marine Drive and Pasco Road since it reverts to local traffic use only.

Features of Option B include:

- construction starts at north end of Westport Road Overpass;
- widen deck of the existing Nelson Creek bridge to achieve six lane cross section;
- four-lane bridge crossing of Larsen Creek;
- new grade separated right hand exit to Eagleridge Drive, Marine Drive, Horseshoe Bay Village, and BC Ferries terminal; Highway 99 through traffic stays on inside lanes, adjacent the median;
- new grade separated on-ramp south of Pasco Road for merging northbound traffic entering from the local road to the existing highway;
- widen the existing Highway 99 to four lanes from south of Pasco Road to Ansell Place interchange;
- northbound access to Pasco Road via Ansell Place Interchange;
- southbound right-in, right-out, left out turning movements provided at Pasco Road;
- replace the Horseshoe Bay overhead structure;
- Marine Drive intersections become local road intersections; and

- local southbound traffic Eagle Ridge Interchange merges with BC Ferries terminal outbound traffic similar to the current situation.

Option D consists of two new lanes up-slope from the existing Highway 99 corridor and includes a two-lane, two-way tunnel of approximately 1 km in length. The new tunnel route and the existing Highway 99 would each carry two-way traffic. Construction of the tunnel route would start at the north end of the Caulfield Interchange. Option D includes upgrading of the existing highway between Marine Drive and Pasco Road to accommodate a portion of the through traffic and improve traffic safety.

Features of Option D include:

- two new bridge crossings over Nelson Creek;
- reconstruct the Westport Overpass structure to accommodate the 6-lane cross section;
- two lane, two way 1 km tube tunnel and parallel safety tunnel;
- widen the existing Highway 99 to four lanes from south of Pasco Road to Ansell Place interchange;
- same in/out turning movements at Pasco Road as provided in Option B;
- new off-ramp south of Pasco Road to existing Highway as provided in Option B); and
- southbound lane rejoins the Upper Levels Highway south of the reconstructed Westport Road Overpass.

Common features of Option B and D:

- connection to the north without backtracking to Caulfield, so no additional traffic is directed to the interchange; and
- connection to the existing highway corridor 700 metres south of Pasco Road which lowers the profile slope of the new lanes from 8% to 4.5%, enables the Pasco Road intersection to support a left-out protected turn lane to create direct highway access northbound and avoids encroachment on Cypress Provincial Park.

WP2 - Sunset Beach to Lions Bay

The MoT proposes to upgrade the existing alignment between Sunset Beach and Lions Bay from two lanes to four lanes and expand the Ansell Place Interchange to accommodate four lanes of traffic. Proposed bridge work includes:

- a new two-lane southbound bridge downstream of the existing two-lane bridge at Charles Creek with the upstream half of the existing bridge rebuilt after the new bridge is complete; and
- concrete overlay on the decks of the existing four-lane bridges at Montizambert Creek, Strip Creek, Newman Creek, and Lone Tree Creek.

WP 3A – Urban Lions Bay

In the Application, the MoT initially considered either a two lane or four lane divided highway through Urban Lions Bay. These options were refined after additional consultation with the Village of Lions Bay between January and March 2004 and refinements to these two-lane and four-lane options are presented in the *Sea-to-Sky Highway Improvement Project Clarification Report – Village of Lions Bay,* March 2004 (Lions Bay Clarification Report). Both options include measures to reduce travel speeds and noise, a bike lane, landscaped median, additional lighting and traffic calming measures. The two-lane option would move fewer lanes of traffic through the community and meet vehicle traffic capacity to approximately 2017. The construction footprint for each of these options is materially the same and includes the width of the roadbed, intersection considerations, and noise mitigation measures. The two-lane option would include a larger center median. Based on additional consultation with the community of Lions Bay since March 2004, the MoT has since decided to proceed to preliminary design with the four lane divided highway option only and has communicated this to the Village of Lions Bay in a letter to the Mayor and Council on May 7, 2004.

WP 3 - Lions Bay (‘M’ Creek) to Furry Creek

The MoT will upgrade the ‘M’ Creek to Furry Creek segment for safety and reliability in select locations through rock slope stabilization, improved highway geometrics and enhanced passing opportunities. There are no plans to widen this section to include a continuous three-lane cross-section. Potential bridge work includes:

- deck widening of the existing two-lane bridge at M Creek;
- downslope widening of existing concrete arch near Loggers Creek;
- concrete overlay on the deck of the existing four-lane bridges at Harvey Creek, Alberta Creek and Magnesia Creek;
- upstream widening of the existing two-lane bridge at Loggers Creek; and
- replacement of existing two-lane timber-deck bridge at Deeks Creek with two or three traffic lanes and downstream sidewalk.

WP 4 - Furry Creek to South Stawamus

Upgrades to the existing highway between Furry Creek and South Stawamus will create a three-lane cross-section to provide for alternating passing lanes. Just north of Minaty Bay Hill, the MoT will either retain the existing alignment or construct a short bypass that would connect with the existing alignment (see Application Volume 1 Map and Drawing Folio – Drawing 41DK-PAHS-0420 & 0421).

Proposed bridge work includes:

- twinning the existing Furry Creek two-lane timber-deck north bridge and concrete box-beam deck south bridge on the upstream side with a new northbound structure;
- possible replacement of the existing Britannia Creek two-lane steel through-truss bridge with a new three-lane and upstream sidewalk raised profile structure on the existing alignment;
- twinning of the existing two-lane bridge at Gonzales Creek on the downstream side with a new two-lane southbound structure or replacement of the existing bridge with a new three-lane structure downstream and decommissioning of the existing bridge; and
- widening of the existing two-lane bridge at Shannon Creek on the upstream side for two additional traffic lanes (no temporary crossing is required).

WP 5 - South Stawamus to Depot Road

The highway through Squamish between South Stawamus and Depot Road will be upgraded along the existing alignment to four-lanes plus full turning movements at the signalized intersections. Urban design features, such as raised medians and curb and gutter will be considered, particularly near signalized intersections. Proposed bridge work includes:

- replacement of the existing two-lane Stawamus River bridge with a raised, longer span, four-lane bridge. Northbound lanes will be along the existing alignment, southbound lanes will be on the downstream (west) side;
- replacement of the existing two-lane Mamquam Blind Channel bridge with a new four-lane two-span structure centered about the existing alignment; and

- twinning the existing two-lane Mamquam River bridge with a new downstream structure for two southbound lanes and modification of the existing bridge.

WP 6 - Depot Road to Culliton Creek
The highway between Depot Road and Culliton Creek is currently three-lanes. The only highway improvement work being considered in these sections is a two kilometre south bound passing lane north of the Cheekye River Bridge.

WP 7 - Culliton Creek to Cheakamus Canyon (North)
Construction is underway to widen the existing two-lane highway to three-lanes and to improve the alignment in this section. This work is not part of the Project under review.

WP 8 - Cheakamus Canyon (North) to Function Junction
The existing highway between Cheakamus Canyon (North) and Function Junction will be upgraded to a three-lane cross-section to provide for alternating passing lanes. Currently, it is a two-lane highway with a couple of short four-lane segments which will be preserved. Proposed bridge work includes:

- downstream widening of the existing two-lane Rubble Creek bridge to accommodate a third traffic lane;
- construction of a new two-lane northbound parallel bridge on the upstream side of the existing two-lane Cheakamus River bridge and modifications to the existing bridge for southbound lanes;
- construction of a new two-lane northbound parallel bridge on the upstream side of the existing Daisy Lake bridge and modifications to the existing bridge for southbound lanes;
- widening to both sides of the existing Brandywine Creek bridge; and
- maintaining the existing two-lane Callaghan Creek bridge for one-lane southbound traffic and twinning the existing bridge with a new two-lane structure on the downstream (East) side for northbound traffic.

There are also new BC Rail line overpasses proposed south of Brandywine Falls Park and south of Function Junction.

Ancillary Works
The Project may also include the following ancillary activities and temporary works:

- the section of BC Rail line between Magnesia Creek and Furry Creek may be paved and used as a southbound traffic lane during the 2010 Olympic event;
- construction, use and dismantling of a barge loading facility at Sunset Marina as well as the use of the existing ferry facility at Porteau Cove Provincial Park;
- construction, use and dismantling of temporary bridges at Deeks Creek, Britannia Creek and Mamquam Blind Channel;
- creation, use and restoration of construction staging and equipment storage areas;
- creation and use of aggregate production and suitable material stockpiling sites;
- creation and use of surplus material disposal sites such as the existing MoT Westport and MoT Brunswick Pits for non-Acid Rock Drainage (ARD) and non-Metal Leaching (ML) surplus material and use of Britannia mine site for disposal of ARD/ML material;
- disposal of materials at designated ocean disposal locations of Watts Point site in Howe Sound and the Point Grey site in Burrard Inlet; and
- relocation of hydro towers.

Use of the BC Rail Line

The MoT is in discussions with BC Rail to finalize a formal agreement to use the BC Rail line during the Olympics as an additional southbound lane for traffic between Magnesia Creek and Furry Creek. Access from the highway to the rail bed in the vicinity of Brunswick Beach would either be just to the north of Magnesia Creek Bridge or just to the south of the M Creek Bridge. Use of the rail line as an additional southbound lane is also proposed in the area of Britannia Beach. The concept is to pave outside of and between the tracks, similar to a streetcar system and use the additional lane primarily during the peak morning hours, when two northbound lanes are required for the Olympic transportation needs. No rail operations will occur on this section during the Olympics. The MoT proposes to restore the rail line to its original condition after an additional lane is no longer required.

Major Work Items and Construction Activities for the Project

Rock Excavation

- construction of access roads
- drilling of blasting holes into rock face and loading of explosives
- placement of blasting mats to contain fly rock, where required
- detonation of blast
- loading of blasted material into haul trucks
- transport of surplus material to barge loading areas, storage areas, fill sections and/or disposal sites
- additional scaling and trimming to achieve safe, stable slopes

Retaining Walls

- clearing and grubbing of overburden material
- construction of access roads
- excavation of side slope to form footing base for retaining wall
- temporary shoring works, (i.e.: grouting, shotcrete)
- transport of pre-cast concrete wall segments to site
- hoisting and assembly of wall segments
- drilling of anchor holes into hill side and fastening of tie backs or installation of restraining straps
- transport, placement and compaction of back fill

Bridges

- clearing and grubbing of overburden material
- installation of piling, if required
- excavation of ground to form base for abutment and column footings
- placement of formwork and reinforcing steel for foundation, abutments and columns
- pouring of concrete for foundation, abutments and columns
- installation of superstructure (steel or concrete girders, etc.)
- placement of formwork and reinforcing steel for bridge deck
- pouring of concrete for bridge deck
- construction parapet walls
- membrane and asphalt concrete pavement of bridge deck

Grading and Asphalt

- clearing and grubbing
- cut and fill to set the sub-grade elevation
    - excavation of excess material from cut sections
    - transport of excess material to fill sections or to temporary stockpile storage areas
    - grading and compaction of sub-grade foundation
- production, transport of granular material for road base to the site
- grading and compaction of granular material in layers
- paving of road base with asphalt surface in two layers
- apply pavement markings and erect signage
- installation of concrete median barriers and guard rails, where required

Tunnel (If Option D Constructed)

- rock excavation
- transport of surplus material to storage area and/or disposal sites
- transport of pre-cast tunnel liner panels to site
- assembly of tunnel liner and grouting
- construction of entrance portal structures
- pouring of concrete road base
- installation of electrical and mechanical equipment (lighting, ventilation and fire suppression, if required)
- other ancillary works including emergency escape passages

Test Section

One goal of the MoT is to minimize traffic disruptions during Project construction and this presents major challenges in areas of rugged terrain where construction requires blasting and slope stabilization works. In the Application, the MoT proposed design strategies and construction methodologies to meet this goal but wished to test these on an actual section of highway to fully gauge their effectiveness.

The MoT identified a one kilometre section of highway just north of Sunset Marina, between Montizambert Creek and Strip Creek as a suitable location to test some of the proposed construction methods and traffic management strategies because the area presents construction and traffic management challenges, contains no stream crossings or other sensitive habitat and would allow the MoT to validate its approach and methodologies for minimizing traffic impacts to the traveling public (Ref: Volume 1 Map and Drawing Folio – Drawing 41DK-PAHS-0404 & 0405).

The MoT applied to the Environmental Assessment Office (EAO) on July 18, 2003 for permission to build this test section and provided a construction timetable. After consultation with local governments, provincial and federal agencies and First Nations, the EAO and federal Responsible Authorities concluded that any local concerns associated with the test section could be easily mitigated and approved the request on August 11, 2003. Test section construction was scheduled from mid-September 2003 to the end of June 2004 with no work between December and February that might delay vehicle traffic and impact to winter tourism in the corridor. The approval required the MoT to report on the test section construction by November 28, 2003 and this was done.

The MoT reported that, in practice, test section construction began on November 3, 2003 after delays in selecting a contractor. While less work than planned was completed by the end of November 2003, the MoT was able to test some traffic management regimes, verify some geotechnical assumptions and collect information to refine a future Request for Proposals for the Sunset Beach to Lions Bay section (WP2) to obtain more accurate or competitive prices. Assumptions about median walls and alternative retaining wall designs were tested in March and April 2004 when the MoT resumed test section construction.

3. CONSIDERATION OF ALTERNATIVES

As described in Volume 1, Section A4 of the Application the MoT evaluated a number of alternatives to the Project. This included alternative transportation corridors to link Vancouver to Whistler and, within the existing corridor, alternative means of transportation to reduce or eliminate the need for upgrades to Highway 99.

Alternative Corridors

The MoT considered five alternate corridor routes to Whistler:

- Harrison Mills to Mt Currie corridor route;
- Indian Arm/Indian River corridor route;
- Seymour River corridor route;
- Hybrid Seymour River-Indian River corridor route; and
- Capilano River corridor route.

Using information from previous studies the MoT concluded that these other corridor options would cost from 78% to 200% more than the proposed Project, would introduce a major highway into relatively inaccessible ecosystems, could not be completed in time for the 2010 Winter Olympic Games and would not eliminate the need for safety and reliability upgrades on the existing Highway 99.

Alternative Means of Transport within the Existing Corridor

Within the existing corridor, the MoT considered maintaining the *status quo* (no upgrade), a marine option, a rail option and a Transport Demand Management (TDM) option. The details are provided in Volume 1, Section C of the Application.

The MoT predicts that as traffic volumes increase over the next twenty years, maintaining the *status quo* (no improvements) would increase accident frequency and driver delay due to queue delay and slower traveling speeds, reduce opportunities to perform needed highway maintenance and have negative economic impacts in communities along the corridor. The *status quo* option also does not meet the provincial commitments for hosting the 2010 Winter Olympic Games.

While a high-speed commuter ferry service operating between Squamish and Vancouver is operationally feasible and would provide a realistic means of transport if tolls were instituted on private vehicles between Horseshoe Bay and Squamish, the MoT estimates that this option would cost about $271.3 million, may only capture about 3% of drivers and do little to mitigate the need for highway improvements.

A rail and ferry service combined would capture less than 5% of the current traffic demand and would not defer the needed improvements to the highway. A higher speed railway proposed and passenger ferry/bus service could cost in excess of $1 billion and $271 million respectively to implement and are not cost-effective alternatives to the Project.

The MoT also concluded that TDM measures alone will not eliminate the requirement for safety and reliability upgrades to the current highway. Section 12.2 of this Assessment Report presents TDM issues in more detail.

The EAO and the federal Responsible Authorities are satisfied that the MoT has carried out an adequate assessment of project alternatives.

4. PROVINCIAL AND FEDERAL REVIEW OF THE PROJECT

Basis for the Provincial Review

The *British Columbia Environmental Assessment Act* (BCEAA) includes a provision [Section 7(1)] allowing the proponent of a project that is not reviewable under the *Reviewable Project Regulations* (BC Reg 370/2002) to request that the Project be designated as reviewable and subject to an environmental assessment.

On January 20, 2003 the MoT requested the EAO to designate the Project a reviewable project. The EAO granted this request and, on June 27, 2003, set out the scope, procedures and methods for the environmental assessment in a procedural order (Section 11 Order) also the EAO also provided detailed Terms of Reference to the MoT specifying the information required for the MoT's Application.

Basis for the Federal Review

A project is subject to the *Canadian Environmental Assessment Act* (CEAA) where a federal authority either: proposes a project; sells, leases, or otherwise transfers control or administration of land to enable a project to be carried out; contributes money or any other form of financial assistance to a project; or exercises in relation to the project a regulatory duty (such as issuing a license, permit and approvals) that is included in the *Law List Regulation*.

For the Project, the MoT will require an authorization under section 35.2 of the federal *Fisheries Act*, a permit under the *Canadian Environmental Protection Act*, for ocean disposal of excavated materials and approvals under the *Navigable Waters Protection Act* where bridge works are constructed over navigable waters.

Pursuant to a tentative agreement between the Squamish Nation and the MoT, a permit under the *Indian Act* will be used to rectify the existing land tenure situation on IR#24 and accommodate the additional Reserve lands required for the project. Indian and Northern Affairs Canada (INAC) did not participate in the review of the project as a Responsible Authority until this land tenure information was known on March 23, 2004. INAC respects and accepts the expertise of Fisheries and Oceans Canada (DFO) and Environment Canada (EC) in coming to their conclusions on the environmental effects of the project.

Responsibility for the Navigable Waters Protection Act (NWPA) was transferred from the Minister of Fisheries and Oceans to the Minister of Transport on March 29, 2004. Therefore, Transport Canada (TC) is now identified as a Responsible Authority. Review of the impact of this project on navigation was conducted by the Navigable Waters Protection Division (now a division of TC). Pursuant to the EA protocol between TC and DFO for the transition period March 29 - October 1, 2004, the substantive review of other environmental impacts of this project and preparation of the CEAA Screening Report was undertaken by DFO. TC supports conclusions drawn by DFO throughout this document regarding adverse effects.

Each of these legal instruments is included on the *Law List Regulation,* thus triggering CEAA. The CEAA review of the Project is a screening level assessment and the Responsible Authorities are DFO, EC, INAC and TC.

Cooperative Review Process

The Canada/British Columbia Agreement for Environmental Assessment Cooperation provides for coordinated environmental assessment processes to avoid uncertainty and duplication where a project is subject to review under the BCEAA and CEAA. For cooperative reviews, the CEAA assessment is conducted using the process established by BCEAA and the results are documented in a common environmental assessment report. To complete a screening under CEAA, the RAs will base their CEAA conclusion on relevant factors reported in this Assessment Report and on other requirements for federal decision-making.

5. PROJECT COMPONENTS AND SCOPE OF ASSESSMENT

Scope of the Project

The procedural order issued by the EAO (Section 11 Order) specifies that the Project includes the following on-site and off-site physical works, as well as the activities associated with construction, operation and maintenance of these works:

(a) the works necessary to improve the existing highway, including:
  (i) any road development in a new right-of-way or road widening or relocation along an existing right-of-way,
  (ii) modification of existing access roads to and from the Highway (whether through reconstruction, relocation, elimination or other changes),
  (iii) development of any new road-related structures and excavations, and modification of any existing structures and excavations (whether through additions, removals or other changes), and
  (iv) modification of water diversion and drainage structures serving the Project (whether through additions, removals or other changes);
(b) methods and locations for disposal of rock, surplus material and other waste;
(c) construction, use and maintenance of new ancillary facilities such as equipment storage and marshalling areas, barge access areas and gravel borrow areas, and any use, modification or decommissioning of any existing ancillary facilities for Project-related purposes, including the adjacent BC Railway right-of-way;
(d) ancillary road system modifications adjacent to the Sea-to-Sky Highway associated with construction, operation and maintenance of the Project;
(e) all off-site facilities such as construction camps or other infrastructure services associated with and necessitated by implementation of the Project;
(f) any off-site environmental compensation works associated with and necessitated by implementation of the Project; and
(g) all activities associated with the construction, operation and maintenance of the upgraded highway, including ongoing maintenance and traffic management.

Scope of the Assessment

The scope of the assessment was set out in the Terms of Reference issued to the MoT on June 24, 2003.

6. LAND REQUIREMENTS AND LAND USE PLANNING

Provincial land use plans provide the framework and context for setting environmental, land use and resource management goals over provincial Crown land. Environmental assessment is conducted within the context of existing land use plans. While environmental assessment examines the effects of a project on adjacent land uses, it is a project-specific review mechanism and has no authority to act as a land use planning mechanism or to re-open previously approved land use plans.

Volume 3, Section A of the Application describes the land requirements for the Project and considers the relationship between the Project and land use planning in the corridor. The MoT predicts that the principal land use impacts during Project construction are related to land required for construction purposes and, potential access problems in areas of construction. Minimal impacts on other land use are predicted. Table 2 presents the MoT's estimates of the property required for the Project to accommodate alignment Option B or Option D, lane widening, bridge widening, possible tunnel construction, interchange modifications and staging areas during construction.

The majority of the property acquisitions are at the southern end of the alignment between Horseshoe Bay and Sunset Beach. Option B has requires more property acquisition than Option D and encroaches on lands that are currently undeveloped. Between Sunset Beach and Whistler, the majority of the highway widening and realignment will be confined within the existing Highway 99 right-of-way. Where properties are required for right-of-way purposes, with the exception of the proposed Options B and D in West Vancouver, the MoT reports these are typically slivers of land from the edge of private property, crown land, utility rights-of-way and BC Rail right-of-way.

Under applicable provincial statutes and legislation, the MoT has standard policies and procedures for land acquisition for highway construction to ensure that each owner is treated fairly and reasonably in the acquisition process. The MoT contacts impacted owners and analyzes their individual situations. In some cases the MoT may acquire a whole property, while in other cases the MoT may require only a portion of a property or temporary access to a property during Project construction.

Table 2 – Preliminary Estimates of Property Requirements

Segment Property Ownership	Property Requirements (hectares)
Horseshoe Bay to Lions Bay	
Crown Land	1.6
BC Rail Right-of-Way	0.4
Utility Right-of-Way	5.4
Municipal (Option B)	14.4
Private Property (Option B)	13.4
Subtotal	35.2
Lions Bay to South Stawamus	
Crown Land	1.0
BC Rail Right-of-Way	0.4
Utility Right-of-Way	1.9
Private Property	5.6
Subtotal	8.9
South Stawamus to Depot Road	
Crown Land	0.1
I.R. 24	0.7
Private Property	1.0
Subtotal	1.8
Cheakamus Canyon to Whistler	
Crown Land	2.7
Provincial Park	4.54
BC Rail Right-of-Way	2.0
Utility Right-of-Way	1.3
Private Property	1.6
Subtotal	12.14
Total	58.04

Source: SNC Lavalin estimates

Notes:

i) Property requirements were estimated using preliminary information and are subject to change upon completion of property title search and finalization of alignment and design.

ii) For Horseshoe Bay to Lions Bay Option B areas are shown since they exceed requirements for Option D.

7. INFORMATION DISTRIBUTION AND PUBLIC CONSULTATION

The EAO encourages proponents to seek public input early in project development as part of pre-application activities and, when an application is filed, report the results of consultations, propose measures to address public issues and outline steps for further consultation during the application review period.

The MoT has employed a process known as Context Sensitive Design (CSD) to help plan the Project. CSD is a collaborative, interdisciplinary approach where highway design is not only a technical exercise to meet safety, reliability and capacity goals but is also an effort to create a project that is sensitive to physical settings, community needs and preserves aesthetic, cultural, historic and environmental resources. The MoT, through its Owner Engineer (SNC Lavalin) established two structures for MoT/community dialogue:

Technical Liaison Committee (TLC) This is an interagency working group that meets regularly to review project issues and includes representatives from: the municipalities of West Vancouver, Lions Bay, Squamish and Whistler; the Squamish-Lillooet Regional District; the Greater Vancouver Regional District (GVRD); the Squamish and Lil'wat First Nations; BC Rail, BC Ferries, Utility Agencies; and the Greater Vancouver Transportation Authority (Translink). The TLC serves to streamline agency coordination and TLC meetings update participants on the status of the Project, review issues and impacts and promote contact with/between the MoT and stakeholder groups. TLC activities include workshops, discussion of corridor wide details such as service and signage needs, and efforts to harmonize Project design with Official Community Plans or Area Plans or future recreational and development needs. There are Technical Liaison Subcommittees in West Vancouver and Squamish where more technical consultation is required between the Owner's Engineer and senior municipal staff. Minutes of TLC meetings are posted on the EAO website.

Community Advisory Groups (CAG) These are groups of individuals nominated within their own communities who participate in the design review process to identify and compare provincial and community needs, issues, goals and objectives. This brings the design process closer to the community and the goals of Official Community Plans. There are CAGs for the Greater Vancouver Regional District (Strachan Point, Montizambert Creek, Ocean Point), Lions Bay, Squamish-Lillooet Regional District, Furry Creek, Britannia Beach and Pine Crest Estates/Black Tusk Village. Minutes of CAG meetings are posted on the EAO website.

To develop its Application, the MoT also conducted broader-based public consultation. This included public open houses and town hall meetings between October 9 – 31, 2002. Volume 4, Section B of the Application describes the MoT's pre-Application consultation activities and proposed measures for further consultation during the review of the Application.

When the MoT submitted its Application for screening, the EAO, in accordance with the *Public Consultation Policy Regulation* (B.C. Reg. 373/02), reviewed MoT's reporting on past and future public consultation programs and issued a written assessment to MoT on July 30, 2003. The EAO was satisfied with the public notice provided by the MoT for the public meetings and open houses which MoT organized in communities in the vicinity of the Project during the pre-application phase. The EAO concluded that the purpose, objectives, and scope of the MoT's public and stakeholder consultation program were clear and consistent and the roles, responsibilities, and authority of all participants were clearly defined and communicated.

The EAO also found that appropriate processes and involvement forums were used to share information and facilitate the input of participants during both the *Conceptual Project Scope* and the *Planning and Preliminary Highway Design* phases of consultation and that the structure and function of the TLC and the CAG effectively coordinated issues and involved stakeholders to ensure local issues and concerns were consistently understood and considered.

Consultation During the Application Review Period

After the Application was accepted for formal review, the EAO and the MoT undertook measures to notify the public, provide information about the Project and create opportunities for public participation in the environmental assessment. The MoT carried out two structured consultation programs during this environmental assessment review. The first coincided with the start of the public comment period on the Application in August 2003 and targeted all corridor communities. A second program, between January and March 2004, focused on the communities of West Vancouver and Lions Bay to further explore preliminary alignment options in these communities.

Consultation Activities - August to October 2003

In August 2003, the MoT advertized the start of the environmental assessment review and the dates for the public comment period in the *Squamish Chief*, *Whistler Question*,*North Shore News*,*Vancouver Sun*,*The Province* and the *Kamloops Daily News*. The MoT then organized, advertized and conducted a series of open houses to present the Project, study findings and conceptual design drawings. The open houses included a moderated public forum where a panel of MoT environmental and engineering staff and EAO representatives answered written questions submitted to the moderator. Table 3 provides the location, dates and attendance levels at each of the open houses. Table 4 summarizes the various issues raised at the open houses and cross-references them to sections in this Assessment Report where related issues are discussed.

Table 3 - Location, Dates and Attendance Levels at the MoT Open Houses During the Public Comment Period on the Application.

Date	Location	Number of Attendees	Number of Written Questions
September 12, 2003	Whistler	20	10
September 15, 2003	Furry Creek	35	17
September 16, 2003	Squamish	40	33
September 18, 2003	Lions Bay	70	50
September 24, 2003	West Vancouver	90	68

The EAO also carried out notification and consultation measures to gather public input during the review of the Application. The EAO posted the Application on its Project Information Centre, provided notice of the start of the formal review and conducted a fifty-nine day public comment period on the Application from August 20 to October 17, 2003.

During the public comment period, the EAO received 105 written letters and submissions. Table 5 shows the number of comments received from various communities along the corridor and the primary concerns by location. The most frequently expressed public concerns were about matters of Project design, Project operations, speeding and safety concerns, noise, connectivity, Transportation Demand Management (TDM), preliminary design detail and the use of the BC Rail line. Appendix 2 of this Assessment Report summarizes the content of each of these public comments and of the written responses provided by the MoT to each writer.

Table 4 - Main Questions Raised at the MoT Open Houses

Issue/Question	Related Discussion in Assessment Report
Lack of detail in the preliminary alignment drawings	Section 12.1
Transition from four lanes at Lions Bay	Section 12.3
Highway capacity and four lanes all the way to Whistler	Section 12.1
Proposed speed limits	Section 12.1, 12.3
Rock removal and disposal impacts	Section 11.4
Tunnel at Nelson Creek	Sections 11, 12
Use of BC Rail right-of-way during the Olympics	Section 2
Noise Impacts	Section 12.3
Aquatic impacts from stream crossings and runoff	Section 11.2
Air quality	Section 11.6
Construction impact on trails and recreational facilities	Section 12.5
Cycling facilities along the corridor	Section 12.1
Construction Traffic Management	Section 2, 12.4
Emergency vehicle access during construction period	Section 12.4
Transportation Demand Management	Section 12.2

Table 5 -Summary Analysis of Public Comments Received by the EAO During the Public Comment Period on the Sea-to-Sky Highway Improvement Project Application

Location of Writer(s)	Number of Letters/Documents	Primary Concerns
Vancouver	10	Transportation Demand Management
West Vancouver	21	Tunnel Option Caulfield Interchange/Pasco Road Access Emergency Response Ferry Traffic Construction Impacts (Westport)
Lions Bay	34	Noise Impacts/ Data Collection Methods Speeding/Safety Impacts Kelvin Grove Access Merging four lanes to two lanes

Location of Writer(s)	Number of Letters/Documents	Primary Concerns
Britannia Beach	2	Contaminated Sites Interchanges
Furry Creek	6	Noise/Speeding
Squamish	11	Recreation Impacts (Murrin Park) Highway Design Impact on commuters to Whistler
Pinecrest/Black Tusk	3	Community Water Supply Interchanges Noise
Whistler	3	Access Traffic Management
Other	15	Alternative Transportation Modes (Train) Cycling Opportunities Environmental

The MoT Consultations with West Vancouver and Lions Bay in 2004

There was significant concern expressed in West Vancouver and Lions Bay about the alignment options proposed for these communities in the Application. In response, the MoT decided in January 2004 to proceed with additional public consultations and refine the preliminary alignment in West Vancouver and Lions Bay to better address concerns and issues raised. The MoT held additional open houses in the West Vancouver area on February 16 and 22, 2004 to present revised options for the preliminary alignment between Horseshoe Bay and Ansell Place. In Lions Bay the MoT held an open house and public meeting on February 28, 2004 to present revised options for the preliminary alignment through the community (Work Package 3A) and associated noise reduction measures.

The results of these consultations and the revised alignment options for each community proposed by the MoT for certification are described in the West Vancouver Clarification Report and the Lions Bay Clarification Report.

The EAO conducted a focused public review of the Lions Bay and the West Vancouver Clarification Reports. The reports were posted on the EAO Project Information Website. The EAO also notified all members of the public who previously commented on the Application, and who reside in the Lions Bay or West Vancouver area, of the availability of the respective clarification reports and invited comments. The EAO received no public comments on the Lions Bay Clarification Report.

The EAO did receive public comments on the West Vancouver Clarification Report. The information provided here by the EAO is for information purposes only. It was not compiled or analyzed using statistical methods and the EAO does not offer any conclusions on whether this information represents general public opinion in West Vancouver.

The EAO received one form letter, with 45 signatories, in support of Option B. The EAO also received a report on an informal poll conducted by the Western Residents Association which indicated that 182 of 186 respondents favoured a tunnel option. Five other letters were also submitted to the EAO.

Two writers expressed concerns about the potential noise, property value and quality of life impacts to the Westport Road, Westhaven, Eagle Harbour and Sahalee neighborhoods from Option D because of the location of the southern portal and southbound exit route which brings traffic closer to the Westport area. The writers were also concerned about the construction phase of the Project and the associated impacts to the Westport area from the construction of Option D.

Three writers expressed concerns about the potential environmental impacts of Option B. Other concerns included potential visual impacts from Option B and the potential for noise impacts to Gleneagles School, particularly during and also post, construction. These writers also commented that a 1.4 kilometre tunnel would reduce the environmental impacts of Option D.

8. FIRST NATIONS PARTICIPATION

The EAO plans and conducts environmental assessments to include meaningful participation by First Nations with asserted traditional territory in the area of a project. This effort begins at the pre-application stage and continues through to the referral of a project to Ministers. The BCEAA requires that the assessment of the potential effects of a reviewable project take into account and reflect government policy. EAO consultations with First Nations are guided by the *Provincial Policy for Consultation with First Nations* (October 2002).

The Project falls within the asserted traditional territories of four First Nations:

- Squamish Nation
- Lil̓wat Nation (also known as the Mt. Currie Indian Band)
- Tsleil-Waututh Nation (also known as the Burrard Indian Band)
- Musqueam Indian Band

The entire Project study area is within the asserted traditional territory of the Squamish Nation. This study area is overlapped to the north by the asserted territory of the Lil̓wat Nation (approximately between Rubble Creek and Function Junction). The southern end of the alignment between Horseshoe Bay and Lions Bay is marginally within the asserted traditional territories of the Tsleil-Waututh Nation and the Musqueam Indian Band.

Pre-Application

The EAO invited First Nations involvement during pre-application and during formal review of the Application through participation on the working groups established to advise the EAO on biophysical and technical design issues and socio-economic and community issues raised by the Project.

The Squamish and Lil̓wat Nations and/or their technical consultant attended working group meetings during pre-application on November 28, 2002, March 3, 2003, and March 10, 2003. During the pre-application period the MoT and the Squamish and Lil̓wat Nations also agreed on various Project related Protocols, MOUs and funding agreements. Terms of Reference for Aboriginal Interest and Use Studies (AIUS) were also developed and the Squamish and Lil̓wat First Nations then completed and submitted their AIUS in July 2003 and August 2003 respectively.

Tsleil-Waututh Nation participation in the pre-application phase of the environmental assessment began in the spring of 2003. The MoT and Tsleil-Waututh Nation finalized a Protocol Agreement in May 2003 that provided the framework and funding for the Tsleil-Waututh to participate in the EA review process. It also provided the resources for the Tsleil-Waututh to participate in the archaeological study program and to prepare a Traditional Use Study (TUS) report related to the proposed Project.

The Musqueam Indian Band was invited by the EAO and the MoT to participate in the environmental review process during the pre-application phase but did not actively participate in the working groups.

Application Review

When the EAO set the scope, procedures and methods for the Project review (Section 11 Order) in June 2003, it outlined measures for First Nation participation during the review of the Application. The EAO invited each First Nation to submit comments on the Application either through their participation on working groups, or individually. The EAO required the MoT to make reasonable efforts to consult with First Nations in accordance with the existing agreements reached between the MoT and the respective First Nations and the consultation program proposed in the Application (Volume 4, Section A). The EAO also required that consultations with First Nations seek to resolve and reach agreement on measures to avoid, mitigate or, where appropriate, accommodate for aboriginal interests identified in aboriginal interest and use studies or other studies which may be potentially affected by the Project.

The Squamish and Lil̓wat Nations participated in all working group meetings during the review of the Application either directly or through their technical consultants (Westland Resource Group and UMA Engineering). The Tsleil-Waututh Nation attended one meeting of the Biophysical/Technical Working Group (September 16, 2003). The Musqueam Nation did not attend working group meetings.

The Squamish Nation and Lil̓wat Nations provided a joint submission with comments on the Application on October 28, 2003 and Westland Resource group provided comments on the West Vancouver Clarification Report on April 30, 2004. Technical and legal firms working for the Lil̓wat and Squamish Nations submitted other comments on behalf of the First Nations throughout the pre-Application and Application review phases. The Tsleil-Waututh Nation provided written comments on October 23, 2003.

During the Application review, the MoT conducted two open houses/community meetings for the Squamish Nation (September 22 and 23, 2003) and one community meeting for the Lil̓wat Nation (October 16, 2003).

The main issues identified by First Nations during the review of the Application are presented throughout this report and the range of issues identified in First Nation written comments on the Application are summarized as part of Appendix 1.

9. FIRST NATION INTERESTS

The *Provincial Policy for Consultation with First Nations* (October 2002) describes the Province's approach to consultation with First Nations on aboriginal rights and/or title that have been asserted but have not been proven through a Court process. In this Policy, potentially existing aboriginal rights and/or title are defined as, and referred to as, "aboriginal interests". In accordance with legal and policy requirements, the Province considers aboriginal interests in relation to an environmental assessment to ensure that First Nation issues and concerns are identified, and the Province's legal obligations towards First Nations are met. First Nation consultation requirements are established for every environmental assessment, within the framework of the Policy and any future updates of that Policy. First Nations with interests in the area of the proposed project (i.e. the project is in proximity to the First Nation's claimed traditional territory) or whose rights may be affected are provided the opportunity to be consulted by the proponent and the EAO.

The federal government also considers aboriginal interests when conducting environmental assessments. While "environment" is defined in biophysical terms under CEAA, the definition given for "environmental effects" is broader and includes "*...any change that the project may cause in the environment, including any effect of such change on the current use of lands and resources for traditional purposes by aboriginal persons*[a]." Accordingly, the current use of lands and resources for traditional purposes is considered in a CEAA assessment.

This section of the Assessment Report is an overview of the measures taken to consider aboriginal interests and is not a presentation of the specific interests identified for the MoT by First Nations. Sections 11 and 12 of the Assessment Report discuss issues identified by First Nations during their review of the Application and participation on the working groups.

The MoT provided support to the Squamish and Lil'wat Nations to enable each First Nation to complete an AIUS. The main purpose of each AIUS was to identify impacts on aboriginal title and rights of each First Nation from the proposed highway upgrades and to recommend mitigation or compensation for impacts that can not be avoided. The AIUS were intended to identify, document, and report on past, present, and planned future Squamish and Lil'wat Nation interests in the land, which might potentially be affected by the proposed highway improvements.

Since the filing of the AIUS reports in July and August 2003, the Squamish and Lil'wat Nations have discussed the potential impacts of the Project on aboriginal interests with the MoT and the Province of British Columbia and worked with the MoT and the Province towards agreements on measures to mitigate or avoid these impacts. To meet its legal obligation to First Nations of consultation and accommodation of aboriginal rights and title, the Province established two separate forums to negotiate and resolve issues. One forum focussed on addressing issues that were directly attributable to the proposed Project, many of which could be primarily addressed by the MoT. The second forum, to which the Province assigned senior level representatives from several Ministries, focussed on broader issues related to potential impacts on aboriginal rights and title. These negotiations took place between September 2003 and May 2004. As a result of these discussions, the Squamish and Lil'wat Nations have indicated that they are now satisfied that their interests in respect of the Project will be accommodated by the Province. The Lil̓wat Nation advised the EAO by letter on March 17, 2004 that the Lil̓wat Nation was satisfied that its interests were being accommodated by the Province. The Squamish Nation advised the EAO by letter on March 26, 2004 that the Squamish Nation had entered into an Accommodation Agreement-in-Principle with the Province in respect of the Project, which resolves the outstanding issues of consultation and accommodation in respect of the Project.

During this environmental assessment the Tsleil-Waututh Nation and the Musqueam Indian Band did not identify specific impacts that the Project may have on their respective aboriginal interests. In comments submitted based on their review of the Application, the Tsleil-Waututh First Nation made several recommendations related to the potential need for modifications to/expansion of the environmental study program that had been implemented by the MoT. The Tsleil-Waututh Nation also commented that approximately ten kilometres of the southern portion of the proposed Project are within Tsleil-Waututh territory and is the only portion of their territory within a Gulf Islands ecosystem. The Nation requested that the Project budget include a significant contribution for expansion of park and/or protected areas in the Horseshoe Bay area.

The MoT considered these comments and provided a written response to the response to the Tsleil-Waututh on February 11, 2004. The MoT noted that in this particular section of the corridor, the MoT is working with the Environmental Stewardship Division within the Ministry of Water, Land and Water Protection (WLAP) to ensure that parks related issues are addressed. It is the intent of MoT to protect sensitive plant communities through restrictive covenants and potentially through the extension of existing park boundaries.

10. CONSIDERATION OF ARCHAEOLOGICAL EFFECTS

The MoT invited the Squamish Nation, Lil̓wat Nation, Tsleil-Waututh First Nation and the Musqueam Indian Band to participate in a Culture and Heritage Assessment program for the Project.

This included an archaeological impact assessment (AIA) to address potential historical and cultural heritage issues for the Project. The objectives of the AIA were to identify potential impacts to heritage sites, and to develop appropriate mitigation strategies for significant heritage sites in potential conflict with proposed highway improvements and associated temporary and ancillary works. Archaeological assessments were limited to locations that could reasonably be expected to be directly or indirectly impacted by the planned activities. The assessments were carried out in accordance with the objectives outlined in the *British Columbia Archaeological Impact Assessment Guidelines (BCAIA)* (Apland & Kenny 1998). The Squamish Nation, Lil̓wat Nation and the Tsleil-Waututh Nation each selected a consulting archaeologist to represent them in the AIA. The work was coordinated by a Historical and Cultural Heritage Coordinator working on behalf of the MoT. The Musqueam Indian Band did not participate in the archaeological work.

Seventeen areas of inferred archaeological site potential were inspected and are presented in Volume 3, Section G, Tables Table 2-1 and Table 2-2 of the Application. No archaeological sites were identified as being in direct conflict with the proposed project impacts. Two terrestrial archaeological sites that are protected under the *Heritage Conservation Act* (HCA) were identified, but neither is in conflict with the proposed Project activities and no direct effects are anticipated. The Squamish and Lil̓wat AIUS report also documented the existence of several

Culturally Modified Trees (CMT's) within the corridor. The MoT has committed to avoiding impacts to these CMT and to reaching an acceptable arrangement with the First Nations if impact cannot be avoided in the event of changes at the detailed design stage.

When the MoT developed Option B it conducted additional archaeological investigations of this section of preliminary alignment on February 28, 2004. No additional archaeological sites were encountered. The archaeological issues for Option D are the same as previously documented in Volume 3, Section G of the Application.

11. CONSIDERATION OF ENVIRONMENTAL EFFECTS

11.1 WATER QUALITY

Volume 3, Section D and Appendix D and Volume 5, Section A of the Application predict the potential impacts of the Project on water quality during construction and operations and propose mitigation measures and a water quality monitoring program.

Background
The Application states that contamination of a water source can result from point and non-point sources created during Project construction (e.g. blasting, siltation, spills) or during Project operations (deposit of substances on the road surface from vehicle tires and exhaust and from de-icing chemicals and winter abrasives). Precipitation eventually flushes these substances from the road surface into ditches and streams and can result in fluctuations in water quality. Sheet runoff which flows across the surface of the roadway and runs down shoulders or slopes will generally constitute most of the non-point sources for contaminants.

The MoT predicts that impacts to watercourses from highway construction and operations would generally occur downstream of the alignment. Where community water sources (reservoirs and collection systems) are upstream of the alignment the potential for impacts is reduced. Groundwater well systems may be affected over a longer period of time as it takes longer for chemicals and other contaminants to penetrate into local groundwater systems. Major water uses that could be affected by the new highway construction include:

- raw water for drinking water supply;
- recreational water quality and aesthetics;
- freshwater aquatic life;
- agricultural uses; and
- industrial water supplies.

The MoT proposes to alleviate impacts on water quality from highway construction and runoff. The MoT's Environmental Management Plan (EMP) will include an Sediment and Drainage Management Plans and a Water Quality Sampling Program to be implemented by the Project contractor.

The Water Quality Sampling Program will consist of:

- a multi-phased water quality audit and performance monitoring program (already underway);
- water quality sampling and analysis of runoff from PAG/ML rock face cuts during the pre-construction, construction and post construction phases of the Project; and

- water quality monitoring during construction for parameters such as suspended sediments, pH and conductivity.

The first phase of the water quality audit included baseline sampling and analysis of surface water streams, groundwater wells and domestic water supplies and the findings are presented in Volume 3, Sections D4 and D5 of the Application. Phase two will occur approximately six months after construction has started on a section of the alignment. Groundwater wells will be randomly sampled. Streams, creeks, rivers and open water bodies will also be randomly sampled to ensure no water quality changes are taking place. During Phase Three, the MoT will also complete post-construction sampling of surface water, groundwater wells and water supply sites within a constructed section. If post-construction sampling indicates that water quality is sub-standard, mitigative measures will be developed and applied, and monitoring extended, until water quality standards are met.

The MoT also proposes to minimize impacts to water quality during construction through measures such as:

- requiring the contractor to prepare Sediment and Drainage Management Plans which must be approved by environmental agencies prior to construction start-up;
- adhering to best management practices (BMPs) and use of appropriate guides such as Washington State Department of Transportation Highway Runoff Manual, "Guidelines For Environmental Design of Highway Drainage (1992)", guidelines developed for the construction of the Vancouver Island Highway Project and any other appropriate guides established during the life of the Project;
- implementing standard forms of erosion control and siltation control; and
- retaining a qualified environmental monitor to conduct water quality monitoring.

The MoT proposes regular site inspections, implementation of required erosion control techniques and ditching plans to minimize potential impacts to water quality during highway operations. Also, the Design-Build-Finance-Operate (DBFO) contractor will apply additional mitigation measures and extend the monitoring. Emergency response plans will also be in place to reduce the environmental impacts resulting from fuel or chemical spills on the highway (see discussion of Accidents and Malfunctions in section 15 of the Assessment Report).

Working Group Review of the Application

An expanded description of the written comments submitted by the BWTG members on water quality issues are presented in the Issue Tracking Table in Appendix 1A of this Assessment Report. The primary water quality issues discussed by the Biophysical Technical Working Group (BTWG) were:

- impact of first flush rainfall events during highway operations;
- water quality monitoring parameters for a water quality monitoring program;
- BMPs;
- potential impacts to water quality from the use of de-icing products and abrasives; and
- ditch maintenance and water treatment measures.

The MoT anticipates that traffic volumes will not reach levels where pollutants left on the surface of the roadway become water quality concerns during first flush rain events. The MoT will monitor first flush events as part of the proposed water quality monitoring program and expects that new ditch designs using swales, check dams and lined channels will reduce suspended solids reaching streams.

The MoT will include oil and grease in the pattern of testing for the water quality audit and performance monitoring program and noted that in the past, monitoring for oil and grease has identified levels at the edge of the pavement but not in the ditches adjacent to the roadway at levels detectable by laboratory testing. The MoT also clarified that sampling points are located in the ditches before runoff reaches the stream.

The BTWG also discussed the potential impact to water quality from the use of de-icing products. The MoT estimates that the quantity of de-icers will increase by 41.5% and abrasives by 31.5% over the length of the upgraded highway. The MoT predicts that high precipitation rates, the presence of large flowing rivers in proximity to the Project and the expanded road surface area for rainfall/meltwater runoff, will offset the potential impact of increased use of these products on receiving waters during operations. The MoT also identified a trend towards the use of anti-icer agents from de-icers (road salt) to reduce salt inputs. The MoT predicts that improvements in drainage designs will maintain water quality during highway operations.

The MoT advised that ditch maintenance is managed under contracts between the Province and its highway maintenance contractors. The ditches are inspected regularly by the MoT Area Managers and the privatized maintenance contractor and an annual ditching plan must be supplied by the contractor each year. The alignment has limited space for treatment ponds but they will be constructed where feasible. The MoT expects that highway BMPs will enhance the removal of solids and any associated sorbed pollutants through adsorption, filtration and settlement.

Another water quality concern raised in public comments and by the Electoral Area D representative of the Squamish-Lilloet Regional District is the potential for highway widening in the Pinecrest/Black Tusk area to increase the risk of accidents or spills adjacent to Retta Lake which serves as the primary drinking water source for the Pinecrest Estates community.

The MoT has since completed a multiple accounts evaluation for preliminary alignment options in the Pinecrest/Black Tusk area and prefers an option that expands the existing highway to three lanes and includes a new drainage system as part of the design to protect the communitiesd drinking water source. The MoT has also committed to further dialogue with the community to address community concerns.

Conclusion

During this cooperative environmental assessment the EAO, DFO and EC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO and EC are satisfied that the Project will not have significant adverse effects to water quality.

11.2 FISHERIES AND AQUATIC RESOURCES

Volume 2, Section B of the Application describes aquatic values, impact assessment methodologies and the potential impacts of the Project on aquatic and riparian values including freshwater fish and amphibian species and their habitats. Appendix B in Volume 2 of the Application summarizes habitat values, proposed works, potential impacts and recommended mitigation measures at each water feature from Horseshoe Bay to Squamish and from Squamish to Whistler. The West Vancouver Clarification Report discusses the potential relative impacts of Option B and Option D.

Background

The MoT and its consultants conducted detailed study of the corridor to assess the potential impact of the Project on fisheries and aquatic resources. This work included development of a list of all known and suspected water features along the existing Highway 99 alignment based on map review, consultant reports, and drainage inventory summaries. Field teams visited every watercourse and wetland potentially impacted by the proposed highway improvement program following the review of background information. Aquatic and terrestrial searches for amphibians and reptiles were done and fish sampling conducted at many sites. The presence of benthic macroinvertebrates and their relative abundance was noted where there was a potential to provide food for fish and/or aquatic wildlife. Finally, a photographic record and drawing were made at each site.

Of 537 potential water feature sites identified prior to the field visits, 361 sites are confirmed to have water features (*i.e.*, roadside drainage ditch, watercourse, lake, ponds, wetlands or estuarine tidal marshes). Of these 361 sites, fish were confirmed or likely to occur in 109 of these sites and amphibians were found at 40 sites. The MoT reports that headwall construction, culvert works or bridge works are planned at approximately 41 fish-bearing water features (rivers, streams and wetlands) along the corridor.

The Application notes that short-term impacts from temporary modifications within sensitive habitat features may result from clearing and grubbing during construction and highway operations, decommissioning and traffic accidents or other unplanned events. It also summarizes potential impacts to freshwater fish and or amphibian habitat resulting from highway upgrading as follows:

- direct loss or alteration of fish and/or amphibian habitat;
- impacts to fish passage;
- impacts to amphibian movement;
- altered drainage patterns;
- water quality degradation; and
- loss or impairment of food and nutrient supply to downstream fish populations.

To comply with the DFO's Habitat Conservation and Protection Guidelines (1998), the MoT has considered the preferred management options for the protection of fish habitat values in order of preference during the design of the highway. The DFO hierarchy of preferences is:

- Project relocation;
- Project redesign;
- mitigation; and
- compensation.

The MoT has mitigated many potential impacts to aquatic values through design measures and predicts that other potential impacts can be largely mitigated through planning, standard construction methods and current BMPs. The bridge and culvert designs described in the Application were developed with input from DFO and WLAP during pre-application. To the extent possible, the MoT has avoided impacts to aquatic habitat from the highway design with the exception of seven sites identified in the Application where unavoidable impacts to fish habitat will occur:

- Larsen Creek – reconstruction of overhead structure;
- Middle Creek – culvert extension;
- Thistle Creek – culvert extension;
- Mashiter Spawning Channel – highway widening;
- Cheakamus River tributary near the old shed site at sample sites SW 84 and 85 – highway widening;
- Wetland at sample site SW 181 - highway widening; and
- Millar Creek - highway widening.

The MoT proposes to develop and implement a Fish and Fish Habitat Mitigation Compensation Plan to achieve no net loss of the productive capacity of fish habitat. Based on preliminary calculations, the MoT estimates that 2,100m^2 of instream habitat and 12,000m^2 of riparian vegetation will be impacted by the Project, including the above referenced sites. The MoT also proposes to offset impacts to amphibian habitat through opportunities provided by fish habitat compensation works or through other separate enhancement initiatives. These initiatives will be further discussed with DFO during the final design phase and finalization of compensation measures for impacts to fish and fish habitat.

In the West Vancouver area, Option B will run along the western edge of the swamp in the Larsen Creek headwaters and impinge on the very western edge of the swamp habitat. It was suggested that approximately 0.68 ha of wetland habitat within the Larsen Creek headwaters could be affected however MoT has committed to avoiding infilling of the wetland through relocation and design. There is double the area of impervious surface in the Larsen Creek headwaters with Option B compared the initial overland option proposed in the Application. In the May 5, 2004 response to working group comments, the MoT provided a review of hydrological issues pertaining to Larsen Creek (Hayco and Company Consultants) and notes that this surface area would only impact between three and four percent of the total catchment area. The MoT notes that design elements will be chosen to ensure water quality and hydrology are maintained and that hydrological function and flow velocity can be maintained through the application of storm water design measures such as constructed wetlands, retention ponds, and bio-filtration swales.

Option D requires two new bridge crossings of Nelson Creek, a high value fisheries stream. Water quality and hydrology concerns are similar to those identified for the previous tunnel option proposed in the Application. There is the need to protect water quality in Nelson Creek, and the need to preserve hydrological function in the Larsen Creek watershed.

A list of potential aquatic impacts and recommended mitigation measures are included in Volume 2, Section B, Tables 3-4 to 3-8 of the Application. The tables provide a general reference of mitigation measures for each phase of the Project including construction, highway infrastructure footprints, highway operations, decommissioning and structures.

The MoT will also, prior to construction, describe measures to minimize potential impacts to fish and fish habitat in its EMP and will:

- retain an environmental monitor;
- require the contractor to prepare Sediment and Drainage Management Plans;
- identify and delineate no disturbance zones; and

- develop plans to revegetate and protect exposed soils.

To address potential impacts during Project operations, the MoT proposes to conduct post construction monitoring of fisheries compensation initiatives, undertake operational activities in accordance with MoT policies and procedures and conduct regular maintenance inspections.

Working Group Review of the Application

An expanded description of the written comments submitted by the BWTG members on fisheries issues and aquatic resources are presented in the Issue Tracking Table in Appendix 1A of this Assessment Report. The main issues identified and discussed by the BTWG included:

- design issues;
- impacts to fish habitat; and
- environmental standards.

The DFO requested clarification from the MoT on steps taken to meet DFO's hierarchy of preferences for the avoidance of impacts to fish and aquatic habitat. The MoT provided two response letters on November 28, 2003 that included an attachment describing how it applied the hierarchy of preferences at each of the main stream crossings including Larsen Creek, Middle Creek, Mamquam Blind Channel and Mamquam River.

The MoT also revised plans for the Horseshoe Bay overhead structure to eliminate any need to relocate Larsen Creek and ensure the long term maintenance of existing in-stream habitats. The MoT will install an open bottom structure at Middle Creek unless there is technical rationale for a closed bottom structure acceptable to WLAP and DFO. All new or upgraded bridgeworks will be clear span structures with the exception of the crossings of the Mamquam Blind Channel and Mamquam River which will require in-stream piers.

After a field trip to observe the wetland area encroached by Option B, DFO reported in its comments on the West Vancouver Clarification Report that the area may not play a major role in maintaining base flows during low water periods. DFO would strongly prefer that if Option B is selected, the MoT make efforts to avoid impact to the wetland by adjusting the routing away from the western edge of the wetland. If a commitment to avoid the wetland cannot be made at this time DFO would like to see a long term monitoring plan developed to ensure that mitigation measures for flows are successful. The DFO also notes that an authorization may be required for work in the upper Larsen Creek area if Option B is selected and for the additional crossings of Nelson Creek if Option D is selected.

At Mamquam Blind Channel, the MoT expects to construct and use a temporary bridge for eight months while the existing bridge is demolished and a new structure built in the same location. The Canadian Coast Guard (Transport Canada) noted it prefers the Mamquam Blind Channel bridge be rebuilt as a clear span bridge with no reduction in overhead clearances. The MoT will consider this possibility during detailed design of the structure but notes there are substantial design constraints.

The DFO has also advised the MoT to adhere to the most current environmental standards and BMPs throughout the six year construction phase. The MoT will apply up to date management practices as they are developed, Land Development Guidelines and develop EMP's for each Work Package so that improvements in standards and practices are continually incorporated in the Project construction phase.

DFO also considered whether the underground excavations required for a tunnel option may create acid rock drainage and whether the volume of slurry produced in the tunnel could create sedimentation problems because of limited area to construct sediment control structures. The MoT has since confirmed that there is enough space to manage water from the tunnel both during and following construction.

The MoT also assessed the potential marine impacts from use of barge-loading sites at Porteau Cove and Sunset Marina. While some construction work is required to modify the existing facilities to accommodate barge traffic resulting from the Project, the main potential for impacts to marine resources would be vessel movement and barge-loading operations. Vessel wake and prop scour (and dredging) can cause the short-term re-suspension of settled sediments.

The MoT predicts that potential impacts from vessel operation can be mitigated by drawing on standard safe operating procedures. This would mean selecting shallow draft tugs and barges, not overloading barges and implementing no-wake policies at barge-loading locations to avoid disturbance to the nearshore environment through wave action. These practices can be supplemented by BMPs for erosion and sediment control at potential upland sources during Project construction. Review agencies were satisfied with the marine assessment and no further information was requested of the MoT.

Conclusion

During this cooperative environmental assessment the EAO, DFO and EC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO and EC are satisfied that the Project will not have significant adverse effects to fish and aquatic resources.

11.3 WILDLIFE AND VEGETATION

Volume 2, Section A and Appendices of the Application describe wildlife and vegetation values, impact assessment methodologies, potential impacts, proposed mitigation measures and a conceptual compensation strategy. The West Vancouver Clarification Report discusses the similarities and differences between Option B and Option D regarding potential impacts to wildlife and vegetation.

Background

During pre-application the MoT proposed terms of reference and workplans for a wildlife and vegetation study that were reviewed by BTWG.

Along the project corridor, over 900 habitat polygons were identified and mapped from recent air photos. Of these, 157 were sampled to fulfill ecosystem mapping requirements, 193 sites were examined for rare plants, 88 sites were sampled for songbirds, 58 for owls, in addition to the incidental information collected on wildlife during each of these surveys.

The MoT's assessment included all at-risk wildlife and vegetation components of the study area including: wildlife occurrence and wildlife habitat; wildlife species and vegetation communities and species identified from both Federal (COSEWIC) and provincial (CDC red and blue lists) systems; and key species of interest. Wildlife evaluated by the MoT included amphibians, reptiles, birds, and mammals. Amphibians in riparian environments were included in the fisheries and aquatic habitat assessment.

Vegetation

The MoT predicts that the primary impact of the Project will be direct loss of vegetation from clearing for right-of-way and ancillary sites, including the barge loading sites. Control of vegetation for highway maintenance purposes may also remove ecosystems from the existing landscape.

The four-lane overland route (Option B) through West Vancouver will require the clearing of 13.5 hectares (ha) of vegetation. Overall, there will be a total vegetation clearing of 111 ha for the entire Project. The tunnel option through West Vancouver (Option D) will require clearing of approximately 10 ha of vegetation for a total clearing of 108 ha for the entire Project. Option B will impact 1.57 ha of blue-listed plant community while Option D will impact 1.64 ha. Within the Larsen Creek headwaters area, Option B affects 0.68 ha of swamp habitat, while Option D affects 0.11 ha.

Option B will impact approximately 1.4 ha of the Douglas fir/Arbutus woodland–rock outcrop ecosystem at Eagle Ridge. Although the area of loss of the Eagle Ridge woodland–rock outcrop complex is less than with previous overland options described in the original Application, it is more internal in location (polygons 406, 407, 408, 409 and 418). Option D is predicted to impact 0.05 ha of Douglas fir/Arbutus woodland–rock outcrop ecosystem at Eagle Ridge.

Other areas with red or blue-listed plant communities affected by the Project are located near Murrin Park, Cheakamus Canyon and Brandywine Creek. Overall, the MoT predicts relatively small losses to red or blue listed plant communities.

Additional potential impacts from the Project to vegetation and plant species considered in the Application include:

- disturbance to the plant community;
- fragmentation of the plant community;
- disturbance to adjacent plant community habitat; and
- loss of diversity.

The MoT rated eleven polygons as high for marbled murrelet nesting habitat and predicts no habitat loss in ten of these polygons. Clearing and grubbing for Project construction between Sunset Marina and Montizambert Creek on the east side of Doodson Corner may remove some potential nest trees. To eliminate that risk, the MoT will conduct pre-construction surveys to determine the nesting potential of this and surrounding areas by marbled murrelets. The MoT states that the inventory and appropriate adjustment of Project design, if murrelets are found in the polygon, will adequately address potential habitat impacts to marbled murrelets.

Working Group Review of the Application

An expanded description of the written comments submitted by the BWTG members on vegetation issues is presented in the Issue Tracking Table in Appendix 1A of this Assessment Report. Discussion of the BTWG focused on mitigation of potential impacts to red and blue listed plant communities and sensitive ecosystems.

The MoT proposes to implement a Sensitive Ecosystems Management Plan as part of its EMP and will:

- confirm the location of rare and sensitive plant communities;
- delineate buffers around the communities;
- manage both land and water access to sensitive sites; and
- control invasive species.

To offset potential residual impacts following the implementation of mitigation, the MoT proposes to implement a compensation strategy. The conceptual strategy includes a plan to develop a wetland habitat near the Callaghan Creek Forest Road to compensate for potential losses to amphibian habitat. The second component of the strategy involves the purchase or placement of restrictive covenants on lands appropriate to compensate for loss of red and blue listed ecosystems and dry arbutus habitat. In January 2004, the MoT met with WLAP and Canadian Wildlife Service (CWS) representatives to outline the MoT's habitat protection efforts. The MoT has reviewed the ecosystem mapping for the corridor and identified a number of parcels that would be suitable as compensation. The MoT predicts that, generally, habitat protection will be achieved through: the adjustment of BC Parks boundaries to encompass the sensitive ecosystem; adding a Restrictive Covenant to a land title if the impacted property owner is willing to be a signatory to the covenant; and/or transfer of the title to a conservation group. The details of the MoT's strategy will be documented in the MoT's EMP.

In its response to reviewer comments on the West Vancouver Clarification Report and the potential for increased habitat loss from Option B, the MoT reported that to compensate for loss of dry arbutus habitat vegetation associated with Option B it has identified approximately 2.5 ha of privately owned property that would be excellent compensation area. The MoT acknowledges that the protection of this area would require the cooperation of the private property owner and could be achieved through restrictive covenants or transferring title to a conservation group. Alternatively, the MoT has identified equivalent ecosystems on Bowen Island and on the Sunshine Coast. The BTWG noted that, for compensation purposes, habitat obtainable in the same ecosystem as the area of impact is preferred to areas more distant.

The SLFN asked the MoT to clarify why regionally rare and significant plants of the area were presented in the Application but the plants listed by the First Nations were not included. The MoT noted that it developed a spreadsheet containing a database of plant species documented during its vegetation surveys and forwarded this database to the Squamish and Lil'wat Nations.

The District of West Vancouver is concerned that if Option B is chosen, the road will have a North-South alignment through the wetland and will go through a second growth stand of predominantly Hemlock, Douglas-fir and Western Red Cedar. Additionally the famous "Squamish" winds have a major influence in this area with signs of natural blowdown evident in the area at present and clearing of the area will only accelerate this process.

An attachment to the West Vancouver Clarification report, prepared by a certified arborist retained by the MoT (Dr. Julian Dunster), reports that windthrow prediction is not a simple matter beyond identification of the most obvious trees that might be clearly considered to be already unstable and acknowledges that the potential for windthrow of trees in this area is an issue. The arborist's response advises that more detailed information about this site is required before it is possible to investigate more specific windthrow mitigation options.

At its meeting of May 7, 2004, the BTWG reviewed the issue of forest edge impacts and the information provided by the MoT in response to working group comments on the West Vancouver Clarification Report. If Option B is selected, the MoT will be expected to undertake more detailed site assessments to delineate features such as forest types, topography, species, age, and tree heights and investigate more specific windthrow mitigation options where feasible.

Wildlife

Project development activities with the potential to impact wildlife, including species at risk, include:

- noise from Project construction and operation;
- changes in wildlife movement patterns to avoid construction or the location of a new alignment; and
- clearing and grubbing, disturbance of nests, removal of top soil and increase in vehicular traffic.

The MoT reports that the greatest potential impacts to wildlife are those associated with direct habitat loss and sensory disturbance, particularly from drilling and blasting of rock cuts. In the West Vancouver area, Option B has more potential to bisect wildlife corridors than Option D, although the MoT predicts that a bridge at Larsen Creek will ensure that any wildlife corridor along the creek can be maintained for Option B. Construction activities are also expected to have high impacts on reptile habitat.

The MoT anticipates potential for adverse effects to amphibians where the Project footprint abuts or encroaches into wetlands in West Vancouver (Option B), near the Rubble Creek Land Hazard (formerly known as the Garibaldi Civil Defense Zone) and Brandywine Creek. Mitigation options proposed by MoT include creation of rock piles and restoration of disturbed areas with the placement of coarse woody debris and plantings of native species.

Impacts to other wildlife species are predicted to be minimal and to address potential impacts the MoT proposes to:

- minimize habitat clearing, wherever possible, most notably around eagle nests and red and blue listed plant communities;
- minimize the duration of construction activities;
- restrict clearing activities within the bird breeding period;
- retain and protect raptor nests and roost trees;
- re-vegetate with native species;
- implement the wildlife protection measures to be specified in the MoT's EMP;
- manage interaction between Project personnel and wildlife;
- follow MoT procedures regarding operations; and
- implement contingency and emergency response plans.

Working Group Review of the Application

An expanded description of the written comments submitted by the BWTG members on wildlife issues is presented in the Issue Tracking Table in Appendix 1A of this Assessment Report. Primary issues were:

- the need for the construction schedule to accommodate the breeding and nesting season for the various species of birds identified in the highway corridor; and
- wildlife monitoring during the construction phase.

The MoT commits to identify construction windows for each relevant bird species of concern to CWS and complete additional nest surveys prior to the start of construction in each work package to verify locations of raptor and heron nests and potential marbled murrelet and Coopersdhawk nests. The SLFN requests that a Registered Professional Biologist (RP Bio.) be specified as the wildlife professional responsible for monitoring trees with nesting potential for marbled murrelet and that efforts be made to minimize highway and vehicle impacts on migrating wildlife.

To also offset any unmitigated impacts of culvert extensions on amphibian habitats the MoT will include special considerations for amphibians during the design of specific fish habitat compensation works, along with additional measures to address any amphibian habitat impacts that can not be offset in conjunction with fish habitat compensation (i.e. Tailed Frog habitats).

Members of the BTWG commented that Option B will result in habitat fragmentation. While the passage for wildlife movement proposed at the Larsen Creek crossing provides some mitigation, additional measures could further mitigate (not eliminate) the overall wildlife movement 'barrier' impact associated with Option B. In discussion at the BTWG meeting of May 7, 2004 the MoT noted that it may be possible to implement additional measures (such as larger lifted culverts) to further accommodate wildlife passage. If Option B is selected, the MoT will consult further with government agencies on design measures to improve wildlife passage.

Conclusion

During this cooperative environmental assessment the EAO, DFO and EC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO and EC are satisfied that the Project will not have significant adverse effects to wildlife and vegetation.

11.4 GEOCHEMICAL

Background

Volume 1, Section C2 and associated Appendices of the Application discuss the potential acid rock drainage (ARD) and metal leaching (ML) effects from the Project on aquatic ecosystems and propose mitigation options. In the *West Vancouver Clarification Report*, the MoT notes that neither Option B nor Option D will increase the potential for ARD/ML relative to the predictions made in the Application for the previous alignment options because the rock formations impacted by these Option B and Option D are not acid generating.

The Application states that ARD/ML is a complex process that can potentially have adverse effects on aquatic ecosystems. ARD/ML may result from rock cuts and/or from excavated material and can elevate metal concentrations in streams and rivers and/or the marine environment. In freshwater and marine water, aquatic organisms such as fish and benthic invertebrates could be exposed to these constituents through a variety of pathways including dermal uptake, absorption though the gill membrane, and ingestion of water and/or prey.

Specific examples of potential adverse effects from ARD/ML in watercourses include, but are not necessarily limited to:

- toxic interactions from reduced pH and increased metal concentrations;
- sediment toxicity where trace metal concentrations are high; and
- reduced habitat availability caused by precipitate settling.

Between Sunset Beach and Lions Bay, aluminum and copper loadings in sensitive streams in proximity to proposed rock face cuts are expected to be within BC Water Quality Guidelines (BCWQG) but will likely exceed Canadian Environmental Quality Guidelines (CEQG) standards during a first flush storm event. In the drainage ditches below the rock cuts along this section of the alignment, aluminum and copper levels will likely exceed the BCWQG and CEQG standards under first flush conditions. Between Squamish and Whistler, aluminum and copper loadings will exceed both BCWQG and CEQG standards in ditches beneath rock cuts near Cheakamus Canyon North, Rubble Creek Land Hazard and Brandywine Creek under first flush conditions.

The MoT identified eleven sensitive streams containing amphibians and/or fish in proximity to the above mentioned rock face cuts. When assessing the potential effects of first flush conditions the MoT used conservative assumptions and anticipates that actual loadings to the sensitive streams during Project construction and operations may be less than predicted. The MoT will conduct a detailed risk assessment during detailed design to refine the nature and extent of the MoT's water quality monitoring program and assess the need for mitigation.

Rock cuts, primarily between Sunset Beach and Lions Bay will generate waste rock that is potentially acid generating material (PAG) and will require disposal. The MoT estimates the total volume of rock excavation, based on preliminary design, to be 40,000 m^3 of which 7,000 m^3 is within the very distinct zone of alteration south of Lonetree Creek. Testing done in December 2003 indicates that the greenstones to be excavated during highway construction near Daisy Lake can be classified as non-PAG material.

The MoT has a number of strategies to manage PAG materials:

- designing the highway to minimize the rock excavation in areas with PAG rocks;
- disposing of PAG rock from the Horseshoe Bay to Squamish section at the Britannia Mine Site or by ocean dumping at the Point Grey Disposal site using the Sunset Marina Barge Loading Facility; and
- encapsulation.

Where PAG materials exist, the MoT will take a proactive approach to mitigate potential for acid rock drainage and metals leaching from rock cuts. Measures may include:

- shotcreting rock slopes or otherwise minimizing infiltration of surface water through PAG/ML materials;
- diverting surface flows or otherwise minimizing the volume of water that is in contact with PAG/ML materials;
- designing ditches that will enhance dilution of acidic or metal contaminated drainage;
- preventing exposure of sensitive species to acidic drainage or metal leaching from rock cuts; and
- treatment of acidic or metal contaminated water prior to discharge to creeks.

The MoT will also implement a surface water monitoring program immediately prior to, during and after construction for all eleven of the sensitive streams identified in proximity to the rock cuts. The monitoring will determine the actual metal loadings to the sensitive streams from the final rock cut faces and whether or not the measured loadings exceed the BCWQG or CEQG criteria. If mitigative measures are required, the surface water quality monitoring program will be extended by the MoT to study the effectiveness of mitigation measures.

Working Group Review of the Application

An expanded description of the written comments submitted by the BWTG members on geochemical issues is presented in the Issue Tracking Table in Appendix 1A of this Assessment Report. The main concerns identified and discussed were:

- feasibility of disposal options for PAG materials;
- controlling ARD/ML from rock face cuts; and
- management of ARD/ML issues during and after construction.

The MoT proposes to use either ocean disposal or the glory holes at the Britannia Mine Site as the primary method for disposal of PAG materials. EC in its written comments on the Application indicated that, subject to permit requirements, the ocean disposal option was feasible. The MEM prefers that the MoT use ocean disposal and/or the Britannia Mine Site for disposal of all PAG materials and avoid the need to encapsulate any PAG because encapsulation requires a long-term commitment to monitoring to ensure its effectiveness.

The MEM, DFO and EC requested that the MoT confirm with the Ministry of Sustainable Resource Management (MSRM) and/or WLAP that use of the Britannia Mine Site would be technically feasible and acceptable. On February 5, 2004 the MSRM issued a letter to the EAO noting that the Britannia Mines Jane Basin glory hole has capacity for the disposal of ARD/ML rock from the Project and, if properly managed, may actually provide a benefit if coordinated with MSRM requirements for positioning of materials. The MSRM noted that a preliminary assessment of the disposal material indicates that the material is of the same nature (acid generating rock) as the sulphide ore bodies remaining in the Jane Basin area. The relatively small amount of disposal material from the Project would not significantly increase acid generation at the site nor adversely impact discharge from the 4100 portal or the operation of the new water treatment plant planned for December 2005.

The MoT commits to apply BMPs in the handling, stockpiling, transportation and placement of PAG material. The MoT also commits not to segregate PAG materials from non-PAG materials within rock cuts unless it is a discrete zone that can be removed cleanly without the potential for contaminating non-PAG materials with those with the potential for ARD/ML.

Because acid generation from exposed rock cuts may not be evident until some years following Project construction, the MEM and the MoT discussed the need for a longer-term monitoring of PAG rock faces exposed by rock cuts. The MoT notes that minimizing the volume of water over the face of rock cuts is difficult due to topography, the volume of rain and the current uncertainty of which sites, if any, would require mitigation. The MoT will, as part of its environmental management planning, adopt a proactive approach to the management of PAG rock cut surfaces and cuts which may have the potential for metal leaching in the future. The plan will include water control measures where feasible.

The MoT further commits to retain a qualified consultant to monitor material characteristics during construction to confirm assessments and to identify any materials with the potential for ARD/ ML that were missed in the planning stages. The contractor will follow approved waste disposal strategies and where necessary, recommend specific mitigative strategies to address unexpected conditions encountered during construction. The MoT will also ensure that ARD/ML predictive information, PAG management plans, mitigation measures and monitoring requirements are available and understood by the contractor during the design and construction phases of the Project.

Conclusion
During this cooperative environmental assessment the EAO, DFO and EC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO and EC are satisfied that the Project will not result in significant adverse geochemical effects.

11.5 CONTAMINATED SITES

Volume 1, Section C4 and Appendices of the Application describe the MoT's preliminary investigation of potential contaminated sites and requirements for further investigations. Remediation measures are identified where possible. No new impacts to contaminated sites are predicted from selection of either Option B or D in West Vancouver.

The primary sources for contamination along the corridor are sulphate producing rock types (ARD), spills of hydrocarbons or chemicals through vehicular accident and long term degradation of the surface or groundwater conditions through the use of winter de-icing chemicals or winter abrasives. The MoT conducted an investigation along the alignment to identify sites where potential contamination may exist and may be encountered during Project construction.

Field investigation in July 2002 concluded that there are few sites where soil or groundwater contamination is likely to exist along the existing Sea-to-Sky Highway corridor. (The methodology employed by MoT is described in Volume 1, Section C Part 4.2 and 4.3 of the Application). The MoT's preliminary contaminated site investigation identified two contaminated sites that could be impacted by the construction phase of the Project:

Britannia Mine Site: Particular care will be required in dealing with soils because it is unlikely that any disturbed soils could be relocated any further than the mine site property. The MoT proposes close coordination with WLAP to ensure that remediation efforts on the site are not compromised. Clearing and grubbing during the initial stage of construction will require some disturbance of the surface soils. The MoT proposes an agreement with WLAP prior to the start of construction so that any soils that require relocation can be safely dealt with and retained within the affected area of Britannia Mine operations.

Gonzales Creek: An accident on Highway 99 immediately north of Gonzales Creek resulting in a hydrocarbon spill occurred at a property near the creek in February 2001. Petroleum hydrocarbon products migrated under Highway 99 and down through the sub-surface soils and fill towards Howe Sound. The contaminant levels exceeded the British Columbia Contaminated Sites Regulation (CSR) standards for residential/parkland development.

To mitigate potential ARD contamination, the MoT will implement a comprehensive ARD/ML management plan which includes a water quality monitoring component. In the event of spill contamination, the MoT anticipates that existing emergency protocols and current legislation will be adequate to address such events that may occur on the highway. In regards to potential contamination from de-icing chemicals, the MoT predicts that high precipitation rates, the presence of large flowing rivers in proximity to the Project and the expanded road surface area for rainfall/meltwater runoff, will offset the potential impact of increased use of these products on receiving waters during operations. The MoT also identified a trend towards the use of anti-icer agents over de-icers (road salt) to reduce salt inputs.

The Project will involve the removal of roadside soils which have received salt runoff for a number of years and therefore may be contaminated with salts. When WLAP develops salt standards for soil and if the roadsides soils are found to be above the numeric standards, the removal and transport of these soils will likely require a soil relocation agreement between the MoT and WLAP. This agreement would likely be similar to the existing agreement between WLAP and MoT on heavy metals in right-of-way soils.

Overall, the MoT predicts that issues relating to potential contaminated soil or water on the Project will be limited.

Working Group Review of Application

An expanded description of the written comments submitted by the BWTG members on contaminated sites is presented in the Issue Tracking Table in Appendix 1A of this Assessment Report. During the review of the Application and contamination issues the BTWG focused on:

- construction works at the Britannia Beach mine site; and
- mitigation requirements for construction in vicinity of the Gonzales Creek hydrocarbon spill.

EC was concerned about the potential impacts to the ongoing remediation work on contaminated sites in the Britannia Beach area. The MoT met with MSRM to discuss Project plans through this area. Although the mitigation and remediation plan for the Britannia Beach site has yet to be finalized, the MSRM has indicated that the highway improvements will not interfere with remediation efforts, the proposed water treatment plant, mine drainage control or the offshore effluent disposal projects. In addition, the MoT met with the Britannia Mine Remediation Project to discuss remediation issues adjacent to the existing highway.

The MoT reports that the construction of the highway over any potentially acid-drainage producing soils will improve the current situation by creating an anaerobic state with a sealed surface. This removes oxygen and surface seepage water which significantly reduces the potential for acid drainage or metal leaching processes to occur.

EC also noted that the MoT's EMP should include mitigation methods for the containment and collection of any liquid phase hydrocarbons in the vicinity of the Gonzales Creek hydrocarbon spill. The MoT responded that the Gonzales Creek Hydrocarbon Spill site is currently being monitored by Levelton Engineering Ltd. and a remediation plan may be implemented prior to construction of the highway. If highway construction proceeds within the area affected by this contaminated site, then the MoT will coordinate with Levelton Engineering Ltd. who are managing the site for Scamp Industries, and with Hemmera Environmental who are managing the site for Interfor (owners of the property on which the spill occurred), to ensure that remediation is done prior to construction.

Conclusion

During this cooperative environmental assessment the EAO, DFO and EC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO and EC are satisfied that the Project will not result in significant adverse effects to or from contaminated sites.

11.6 AIR QUALITY

Background

Volume 2, Section C and Appendices of the Application describe potential Project impacts on air quality. The West Vancouver Clarification Report - also discusses potential impacts to air quality from Option B and Option D.

For Option D, the maximum predicted ambient concentrations will increase at the north or south tunnel exit/entrance depending on the direction of ventilation but is predicted to be neutral to slightly negative and well below applicable ambient guidelines.

Air quality impacts from Option B are unchanged from prior overland options except that the spatial distribution of pollutants from the northbound lanes will be farther away from the existing residences in Horseshoe Bay than previously described in the Application.

To gather baseline data and develop predictions about the potential impact of the Project on air quality, the MoT:

- examined available ambient air quality, meteorological and climate data;
- identified major sources of emissions in the air shed;
- estimated emission of air contaminants from the existing and improved highway;
- predicted the effect of these emissions on ambient concentrations using dispersion models and protocols agreed to with WLAP;
- compared predicted concentrations with federal and provincial ambient air quality objectives ; and
- characterized local and regional changes in emissions in conjunction with data on regional emissions, results of other similar studies and predictive modelling analysis to assess the potential impact of the Project on regional and local air quality.

The MoT predicts that in addition to the vehicle traffic from the improved highway, the use of construction equipment, staging areas, aggregate production, stockpiling sites, and disposal sites may all impact air quality. The construction, use and dismantling of a third lane along the BC Rail right-of-way could also impact air quality while it is in use. Vehicle travel along the highway results in emissions of Criteria Air Contaminants (CACs) and Greenhouse Gases (GHGs) as a result of fossil fuel combustion. GHGs are a concern due to their potential effects on climate change. The Application also considered the potential impact to air quality from traffic generated during the 2010 Olympic Games and notes that the Vancouver 2010 Bid Corporation identified a number of emission reduction strategies for the highway with the potential to achieve a no net increase in emissions during the Olympic Games.

Based on the emissions estimates, the Project is predicted to result in an increase of CAC emissions (by mass) of 9 to 10% in 2010 and 2025 compared to the status quo scenario (no highway improvements). Due to future federal vehicle emission standard regulations, air quality related to the Project is predicted to have an overall improvement with respect to the present-day air quality (CAC emissions will decrease 45% for the highway improvement in 2010/2025 vs. the 2000 baseline scenario). Predicted ambient concentrations of CACs from dispersion modeling for all scenarios were below the applicable ambient air quality guidelines and ambient concentrations are predicted to decrease in future years due to reductions in emissions from vehicles from technological improvements. Ground level photochemical ozone production is also predicted to decrease in future years relative to baseline levels.

There will be a neutral to low impact based on the increase in projected traffic volumes compared to the predicted impacts from increases in traffic without the highway upgrades. The MoT's current predictions of air quality impacts are largely based on projected traffic in 2010 and 2025 and valid to the degree that the projected future traffic levels are accurate.

Maintenance specifications on the highway will provide for cleaning to manage road dust and protect air quality. The MoT reports that if actual vehicle counts increase when the highway is operational and people are adversely affected, road dust management practices should be maintained at an appropriate frequency to off-set potential increases and include provisions to clean the highway where dirt, debris, sand and/or gravel have accumulated to protect air quality in accordance with the local by-laws.

Overall estimates are for GHG's to increase in future years as the estimated vehicle travel demand increases in the Sea-to-Sky corridor, with or without highway improvements. The Project is predicted to result in GHG emissions approximately 9% higher in 2010 and 2025 than the status quo scenario (no highway improvements). The MoT notes that the estimates do not reflect the possible improvements in fuel economy that could be achieved due to de-congestion on the improved highway itself and that GHG emission estimates are best assessed on a larger scale (e.g. Canada/World) to determine if GHG emissions are increasing or decreasing or meet the Kyoto protocol targets.

During Project construction the MoT predicts ambient air quality concentrations below all applicable federal and provincial guidelines. This does not include the potential contributions from road dust from on-road vehicles during construction which may exceed ambient guidelines on a site specific basis during periods of high construction activity. Fugitive dust and diesel particulate matter are of concern during the construction phase as they could contribute to ambient concentrations close to (or over) the British Columbia Level B Objective. The MoT reports that the degree to which air quality could be impacted can not easily be quantified for short-term periods because of uncertainty in quantifying the level of construction activity and road dust in specific areas. The maximum predicted emission concentrations from construction activities are presented in Table 6 and a summary of predicted air quality impacts is presented in Table 7.

The MoT believes air quality can be best managed through use of pollution prevention measures and BMPs during construction and proposes to undertake measures to:

- establish a Vegetative Debris Disposal Plan for clearing and grubbing activities;
- where possible, remove fill material in one trip to minimize amount handled on stockpiles and transferred between construction equipment;

- minimize the time that unpaved surfaces are exposed or water unpaved hauling and unpacked surfaces as frequently as needed to minimize road dust;
- on drier days, ensure soil piles are watered (approximately twice daily) and cover smaller soil piles, or vegetate longer term piles;
- cover the load of haul/dump trucks that are hauling finer grained materials over larger distances; and
- near residences within 50 m of the road (for example in Lions Bay and/or near Squamish), monitor PM_{10} and $PM_{2.5}$ during a few of the driest days each season to ensure that ambient air quality impacts are being appropriately managed.

To meet local air quality bylaws during highway operations, MoT will ensure that road dust management practices are followed in accordance with the MoT's highway maintenance specifications.

The MoT predicts these pollution prevention methods and management practices will reduce the potential impacts of pollutants, especially particulate matter. The MoT will also use data from Horseshoe Bay, Squamish and Whistler air quality monitoring stations to gauge actual ambient concentrations, the impacts of construction activities and the appropriate level of pollution prevention management.

Table 6 - Maximum Predicted Concentrations Resulting from Construction Activities

Pollutant	Averaging Period	Background[1] (µg/m³)	2000 Baseline (µg/m³)	Construction (µg/m³)	Baseline + Construction (µg/m³)	Background + Baseline + Construction (µg/m³)	Ambient Guideline (µg/m³)
SO_2	1-hour	37	7.9	4.0	12.0	49.0	450
	24-hour	22.6	2.76	1.40	4.15	26.8	160
	Annual	6.8	1.79	0.42	0.46	7.3	25
VOC	1-hour	n/a	256.9	6.4	263.3	n/a	n/a
	24-hour	n/a	102.1	2.5	104.6	n/a	n/a
	Annual	n/a	57.8	1.4	59.2	n/a	n/a
NO_X	1-hour	n/a	334.0	331.6	665.6	n/a	n/a
	24-hour	n/a	132.9	131.9	264.8	n/a	n/a
	Annual	n/a	75.1	74.6	149.7	n/a	n/a
NO_2[2]	1-hour	74	133.4	133.2	166.6	240.6	400
	24-hour	58	113.4	113.2	126.5	184.5	200
	Annual	20	32.6	32.5	40.0	60.0	60
PM_{10}	24-hour	36	3.1	6.8	9.9	45.9	50
	Annual	15	2.0	4.4	6.4	21.4	n/a
$PM_{2.5}$	24-hour	12	2.0	5.7	7.7	19.7	30
	Annual	6.1	1.4	4.0	5.4	11.5	n/a
CO	1-hour	1000	2299.6	333.5	2633.1	3633.1	14300
	8-hour	750	1318.8	190.3	1502.3	2252.3	5500
NH_3	1-hour	n/a	7.9	4.0	12.0	49.0	n/a

[1] Based on maximum 98th percentile concentration of StS ambient stations

[2] NOx converted to NO_2 using the Ozone Limiting Method (0.1*concentration + 100µg/m³)

Table 7 - Summary of Predicted Air Quality Impacts

Parameter	Direction	Frequency of Occurrence	Magnitude	Geographic (Spatial) Extent	Duration (Temporal) Extent	Overall Consequence	Likelihood of Adverse Effect	Level of Confidence
SO_2 1-Hour	Positive	Occasional	Low	Local	Short-term	Low	N/A	High
SO_2 24-Hour	Positive	Occasional	Low	Local	Short-term	Low	N/A	High
SO_2 Annual	Positive	Continuous	Low	Local	Medium-term	Low	N/A	High
NO_2 1-Hour	Positive	Occasional	Low	Local	Short-term	Low	N/A	High
NO_2 24-Hour	Positive	Occasional	Low	Local	Short-term	Low	N/A	High
NO_2 Annual	Positive	Continuous	Low	Local	Medium-term	Low	N/A	High
PM (PM_{10}) 24-Hour	Positive	Occasional	Low	Local	Short-term	Low	N/A	High
PM (PM_{10}) Annual	Positive	Continuous	Low	Local	Medium-term	Low	N/A	High
PM_{10} 24 Hour	Positive	Occasional	Low	Local	Short-term	Low	N/A	High
PM_{10} Annual	Positive	Continuous	Low	Local	Medium-term	Low	N/A	High
$PM_{2.5}$ 24 Hour	Positive	Occasional	Low	Local	Short-term	Low	N/A	High
$PM_{2.5}$ Annual	Positive	Continuous	Low	Local	Medium-term	Low	N/A	High
CO 1-hour	Positive	Occasional	Low	Local	Short-term	Low	N/A	High
CO 8 hour	Positive	Occasional	Low	Local	Short-term	Low	N/A	High
NH_3 24-hour	Negative	Occasional	Low	Local	Short-term	Low	Unlikely	High
Fugitive Dust								
PM_{10} 24 hour	Negative	Occasional	Low	Local	Medium-term	Low	Unlikely	Medium
$PM_{2.5}$ 24-hour	Negative	Occasional	Low	Local	Medium-term	Low	Unlikely	Medium

Review of the Application

An expanded description of the written comments submitted by the BWTG members on air quality issues is presented in the Issue Tracking Table in Appendix 1A of this Assessment Report.

At the BTWG meeting of December 4, 2003, the primary air quality issues discussed included:

- GHG Reduction and the application of TDM measures;
- fugitive dust emissions and burning of vegetative debris; and
- degree of certainty about future improvements in emission controls.

The BTWG and the MoT discussed the relationship between TDM strategies and air quality impacts (in particular GHG) from the Project. The MoT noted the importance of TDM along the Sea-to-Sky corridor and has facilitated a TDM study for the corridor with the ultimate goal of improving the corridor's air quality and extending the life of the planned highway improvements. The MoT anticipates that TDM options could reduce the number of annual average daily trips on the highway and reduce GHGs from levels predicted in the Application.

However, the delivery of TDM measures in the Sea-to-Sky corridor is beyond the MoT's sole control and authority. The MoT has committed to participate in multi-jurisdictional efforts at TDM should these develop in the future. The EAO agrees that TDM measures could benefit air quality in the corridor and implementation requires the participation of local governments, TransLink, the MoT and other authorities. The MoT's commitment to participate in future multi-jurisdictional efforts is satisfactory for the purposes of the environmental assessment.

To help address potential air quality impacts from particulate matter during Project construction, the MoT will adhere to municipal prohibitions against the burning of vegetation and currently has no plans for the burning of vegetation debris within the GVRD.

The MoT will also develop and implement a Vegetation Debris Management Plan and monitor for air quality parameters during construction. The details of the air quality monitoring program will be included in the EMP and provided to agencies for review and comment prior to the start of construction on each work package.

For predictions made in the Application about expected improvements to vehicle emission levels from fuels reformulations and vehicle control technologies, the MoT confirmed that only improvements already in place under legislation/regulation are considered in the modeling.

The MoT will be required, prior to the start of construction on any work package, to develop an Air Quality Monitoring and Mitigation Action Plan and Vegetation Debris Management Plan as part of the EMP for that work package, provide WLAP reasonable opportunity to review and comment on the plans and then implement the plans to the satisfaction of WLAP.

The MoT has also agreed to monitor air quality at IR#24 during and after construction and to take appropriate actions if problems are identified.

Conclusion

During this cooperative environmental assessment the EAO, DFO and EC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO and EC are satisfied that the Project will not result in significant adverse effects to air quality.

12. CONSIDERATION OF SOCIO-ECONOMIC EFFECTS

12.1 PROJECT DESIGN ISSUES

Background

Volume 1, Section B of the Application describes the general components of the Project see also Map Drawings and Folios - Volume 1-3). Revised options for the preliminary alignments from Horseshoe Bay to Sunset Beach and through the Village of Lions Bay are presented in the West Vancouver and the Lions Bay *Clarification Reports*.

The design process for a highway upgrade has several stages: pre-design, preliminary design and detailed design. The environmental assessment of the Project is a strategic level review, using preliminary design, to determine whether there is the potential for any significant adverse effects and whether actions can be taken during Project design, construction or operation to avoid or reduce adverse effects to an acceptable level. Preliminary designs are intended to meet the primary goals of safety, reliability and capacity and incorporate community input from pre-design consultations. There is flexibility at the preliminary design stage to modify the alignment to respond to community and reviewer input in cases where changes are technically and economically feasible and may help avoid or mitigate potential environmental or socio-economic impacts.

Under BCEAA, if a proponent receives an environmental assessment certificate and later wishes to modify a project design, the proponent must apply to the EAO for an amendment to the certificate if the design and/or operation of a project is substantially different from the certified project. The EAO then reviews any proposed amendment and, where appropriate, initiates a broader review with other government agencies and First Nations before deciding whether to accept or reject a proponent's request. Under CEAA, if the modification to project design deviates considerably from the original project, then a new environmental assessment of the modifications may be undertaken, using the original assessment to the extent possible.

Working Group Review of the Application

This section of the Assessment Report summarizes design issues identified by working group or local government representatives on a community by community basis. An expanded description of Project related design issues is presented in Appendix 1B of this Assessment Report. All issues discussed in this section can be addressed post-certification. Reviewer comments focused on a wide range of Project design issues including: planning horizons for the Project; cost/benefit factors; connectivity; design options for West Vancouver, Lions Bay and the section of highway between Brunswick Beach and Furry Creek; and TDM measures.

The Mayors of the corridor communities and the SLFN requested that the planning horizon for the Project extend beyond 2025 and employ a goal of minimizing potential negative impacts to each community. The MoT noted that the planning horizon includes short, medium and long-term planning and the current improvements are intended to meet demand without promoting growth to levels that might exceed the region's ability to provide services (e.g. housing, infrastructure).

The MoT has noted that the planning horizon used is consistent with other highway projects of this type. To develop projections to 2050 is difficult because there is not enough reliable data available.

Local governments also commented on the potential expense of paving the BC Rail line from Magnesia Creek to Porteau Cove as a third lane during the Olympics and then dismantling this lane after the Olympics. In response to this concern, the MoT has retained a highway engineering consultant to further examine options for this area and is aware of the importance of minimizing "throw away" costs. The EAO has based its review of the Project on a preliminary alignment that includes the third lane option using the BC Rail line. If improvements to this option are later developed by MoT and require an amendment to the Certificate, the MoT must apply to the EAO for the amendment in accordance with the requirements of BCEAA.

The Squamish-Lillooet Regional District believes that although the fifteen kilometre section of highway north of Lions Bay to Furry Creek is not slated for widening as part of the current Project, the MoT's socio-economic assessment should analyze the population, economic and commuter impacts of the eventual four-laning of this section of road because the resulting four-lane highway access to Vancouver and the Lower Mainland from Squamish will likely produce major impacts on the communities of Howe Sound. The MoT focused its socio-economic assessment on the current upgrades because it is uncertain exactly when four-lane improvements will be done on this section (2017 or later) and what other changes by then will also influence corridor use. For the purposes of this environmental assessment, the EAO has relied on the socio-economic assessment provided in Volume 3 of the Application and additional information from the West Vancouver and Lions Bay Clarification Reports.

Horseshoe Bay to Sunset Beach

The District of West Vancouver Council favours a tunnel option and prefers a three kilometre tunnel over Option D because it believes a three kilometre tunnel would be the most cost-effective option over the long-term. The MoT did not include a three kilometre tunnel option in its Application because the MoT believes this option would be prohibitively expensive, cannot be constructed by 2009 or within the $600 million budget allocated for the Project and would yield a lower benefit/cost premium ratio than either Option B or Option D.

The District of West Vancouver is concerned about the potential environmental impacts of Option B relative to Option D. The District of West Vancouver commented that prior to the development of Option B and Option D, the MoT committed to investigate a tunnel of 1 to 1.4 kilometres in length, whereas, the length of Option D as currently proposed by the MoT for comparative purposes with Option B is only approximately 1 kilometre. In a letter to the EAO of April 30, 2004 the District observed that if the tunnel proposed in Option D were extended by 400 metres it would increase the environmental benefit of the tunnel substantively. The SLFN expressed similar concerns about environmental impacts of Option B, and favour a 1.4 km tunnel because it would have fewer impacts on the land and cultural values of the area.

Emergency access and connectivity were concerns with the overland and tunnel options presented in the original Application and Option B and Option D were developed to respond to these concerns. Options B and D include:

- new grade separated on-ramp and off-ramps near Pasco Road to enter and exit the existing highway;
- northbound access to Pasco Road via the Ansell Place Interchange;
- converting Marine Drive intersections to local road intersections; and

- replacement of the Horseshoe Bay Overpass.

In the West Vancouver Clarification Report, the MoT reports that Option B and Option D both address community concerns about traffic flow at the Caulfield Interchange and emergency response. The MoT estimates that Option B best meets local access and mobility functions, has the social benefit of fewer and less severe accidents with lower insurance payout costs and leaves the existing highway available for local traffic.

The environmental assessment examines whether the two proposed preliminary alignment options between Horseshoe Bay and Sunset Beach have the potential for significant adverse effects but is not intended to select a preferred option. Decisions about what project designs to present in an application for an environmental assessment certificate are the discretion of the proponent.

Lions Bay
Project design impacts on noise levels in the community, access across the highway and traffic speeds in the community were concerns identified during the review of the Application. Noise issues are discussed in section 12.3 of this Assessment Report. The Lions Bay Clarification Report presents design options to maintain or improve connectivity and access with the community. The two preferred intersection designs at this time are: (i) mini-changes at Kelvin Grove and Brunswick Beach; or (ii) an underpass at Kelvin Grove and lower connection to South-view Place/Lions Bay Avenue and a mini change at Brunswick Beach. Traffic speeds will be managed by traffic calming measures (context-sensitive design, speed-limiting curves and raised center medians with landscape features). The MoT is also consulting with the RCMP to discuss ways to facilitate more effective speed enforcement. Examples may include additional pullouts for enforcement use.

Furry Creek
Issues to be further examined during Project development are excessive speeds in the passing lanes on Furry Creek hill and the safety concerns and noise issues this creates. The MoT commits to work with the community to identify practical solutions to mitigate these concerns as the Project moves through preliminary design.

Britannia Beach
Issues to be further examined during Project design are access and egress to the highway from the community and harmonizing highway development plans with community economic development plans for the Mining Museum and waterfront area. The MoT commits to work with the community to identify practical solutions to mitigate these concerns as the Project moves through preliminary design. The community also supports the proposed bypass route east of Britannia Beach which would covert the existing highway to an access road.

Indian Reserve #24 (IR#24)
Issues of concern to be further addressed at IR#24 include community connectivity (ensuring that highway widening does not create a barrier between the residents on each side of the highway), risks to pedestrian safety or children who travel to and from schools located near the highway, avoidance of adverse impact to small business development on IR#24 near the Stawamus Road intersection, creating an "identity" for IR#24, and protecting environmental values near the Stawamus River. The MoT has committed to work closely with the Squamish Nation in the design of the alignment through IR#24 to mitigate the potential impacts of the Project on IR#24.

Urban Squamish

The District of Squamish is concerned that widening the highway through urban Squamish would further isolate pockets of development on either side of the highway. The District believes that the Project should include amendments to the municipal road network to enhance east-west connectivity and that access to industrial and commercial properties adjacent to the highway is also critically important. The District also expects Project design to: provide safe pedestrian passage at all bridges; a continuous, paved pedestrian/ bike path from Valleycliffe to Brackendale; and access and parking for significant trail heads such as the Mamquam Spawning Channel, the Malamute and other trails.

The MoT commits to work with the District of Squamish to identify practical solutions to mitigate access and connectivity concerns as the Project moves to preliminary design. The MoT will include some measures to accommodate bicycle traffic along the highway. Existing signalized intersections will remain to facilitate east-west bicycle and pedestrian movements and the MoT will retain or rebuild pedestrian overpasses across the highway near the Mamquam River Bridge and Garibaldi Way.

Pinecrest Estates and Black Tusk Village

Issues of concern to be further addressed are access/egress from the highway and further protecting Retta Lake (the primary community potable water source) from risk of contamination from accident related spills off the highway. To protect the water supply the MoT proposes to install a new highway drainage system. The community would prefer that the MoT realign Highway 99 to the east, adjacent to the west side of Daisy Lake and convert the existing highway to a service road. The MoT commits to work with the community as the Project moves to preliminary design.

Whistler

The RMOW did not identify any specific Project design issues but is concerned about any increased traffic congestion that may impact air quality, public health and the resort experience in the Whistler Valley.

Mount Currie

The Lil̓wat Nation expressed concern about connectivity near Mount Currie and increased risk to the safety of pedestrians crossing the highway. The MoT predicts that the highway upgrade will add an additional 120 vehicles per day to the highway north from Whistler to Mount Currie. The MoT will continue discussions with the Lil̓wat Nation on connectivity concerns as the Project moves from preliminary to detailed design and will develop solutions to mitigate impacts.

Conclusion

During this cooperative environmental assessment the EAO, DFO, EC and INAC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO, EC and INAC are satisfied that design issues have been sufficiently considered for the purposes of this environmental assessment.

12.2 TRANSPORTATION DEMAND MANAGEMENT

Background

Volume 1, Section A, 4.2.4 of the Application identifies and assesses the feasibility of potential TDM strategies which can be defined as any policy or regulation that facilitates or encourages multi-occupant vehicle use and/or reduces total trip making, particularly, but not exclusively, during congested periods. TDM generally seeks to achieve one or more of the following:

- trip reduction (eliminate the need, opportunity or incentive to travel);
- mode change (encouragement of HOV lanes or increased use of public transit);
- temporal change (encourage vehicles to travel in less congested periods); and
- route change (encourage travel on less congested routes)[2].

The MoT retained TSi Consultants to complete a TDM study. In its final report issued in November 2003, TSi noted that, for the Sea-to-Sky corridor, route change is unlikely as there is no alternate highway route between Vancouver and Whistler. Temporal changes are also unlikely because peak travel is linked to tourism with peaks in the winter season on Friday and Sunday evenings.

The TDM options identified as most available for the highway are trip reduction and mode change. These are discussed in detail in the final TSi report and are not repeated in this Assessment Report. A copy of the TSi report is available on the EAO Project Information Centre.

The MoT has already investigated some mode change options including:

- high occupancy vehicle (HOV) lanes;
- car pooling/ridesharing programs, facilities and services;
- encouraging alternative modes of transportation; and
- promotion of bicycling.

The MoT reports in the Application that enforcing the appropriate use of HOV lanes would be difficult and expensive due to the mountainous terrain, remote nature of the highway and overall length. The highway would also be relatively uncongested to the year 2025 and beyond and thus offer little incentive for carpooling or ridesharing.

The MoT notes a joint initiative of the districts, municipalities and villages along the corridor could most effectively develop and implement car pooling because this measure involves cooperation and coordination amongst the corridor communities. The Project does not include specific physical facilities for carpooling/ridesharing measures since a corridor-wide TDM plan has not yet been developed. The MoT could support carpool/rideshare programs and facilities by providing safe and convenient highway access to carpool/ridesharing parking lots.

As discussed in section 3 of this Assessment Report, bus and rail options would not eliminate the requirements for highway upgrades and would divert a low percentage of drivers from their cars. The MoT will support potential improvements to bus and ferry service by providing, where appropriate, bus pull-outs to facilitate safe and convenient bus passenger loading and unloading and highway access to potential bus and ferry terminal locations.

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[2] Sea-to-Sky TDM Study Final Report, TSi Consultants, November 2003, p.17

The Project specifies varying levels of improvements to different parts of the corridor. Where new construction is proposed, a minimum 1.5 metre wide shoulder will be provided to accommodate bicyclists along the highway. Where highway upgrading will be deferred to a later stage, the existing shoulders will remain at the current widths.

As the TDM study progressed the findings were shared with the TLC and work-shopped to evaluate potential TDM measures and identify implementation strategies and recommendations. A series of measures were identified, rated as either high, medium and low priorities and include:

- Parking Pricing and Supply Management
- Parking Priority
- Strengthened Conventional Inter-Urban Transit
- Combined Transit/Recreation Pass
- Promotion of a Sustainable Resort
- New Premium Transit
- New Marine Services

The TLC also made nine recommendations, several of which fall under the authority of government agencies other than MoT and require support from the corridor districts, municipalities and communities to implement.

Review of the Application
An expanded description of the written comments submitted by the Socio-Economic Working Group (SEWG) members on TDM issues is presented in the Issue Tracking Table in Appendix 1B of this Assessment Report. The Resort Municipality of Whistler was pleased with the MoT's decision to study TDM measures and fund the TSi study and recommended that the TDM measures presented in the study move to implementation. The Lil'wat Nation noted that improvements to the transit service between Whistler and Mount Currie would provide better commuter access between the two communities.

The EAO notes that recommended TDM measures, other than bicycle lanes on the highway shoulders, require the participation of many jurisdictions, are beyond the sole authority and control of the MoT and are beyond the scope of the environmental assessment for this Project. The MoT has committed to participate in future multi-jurisdictional discussions towards delivery of other TDM measures if a forum is assembled.

12.3 NOISE

Background
Noise is commonly referred to as *"unwanted sound"*, because it interferes with human activities and/or creates annoyance. Determining what sounds constitute noise is somewhat subjective since it depends on the situation, the activities engaged in as well as individual attitudes and sensitivity. Figure 2 shows common levels of noise in a community represented in A-weighted decibels (dBA).

Volume 3, Section C of the Application and Appendices report on the potential noise impacts of Project construction and operations and propose measures to mitigate impacts. Volume 3, Section C, Appendix 1B of the Application provides the time series data from baseline monitoring at the southern end of the corridor and at IR#24. Volume 3, Section C Appendix 4 describes predicted noise exposures from construction activities.

The Application includes reporting on potential noise impacts from use of the BC Rail line as a traffic detour during Project construction. The MoT subsequently decided that it will not require use of the rail line as a detour for traffic during Project construction.

The MoT Noise Impact Assessment Methodology

The MoT assessed the potential noise impacts of Project construction and operation by quantifying noise levels at selected points along the existing corridor to establish baseline levels and then predicting changes to the baseline from highway construction activities and future Project operations. This included the following tasks:

- identify all noise sensitive land uses (residential, passive parks, schools) along the corridor;
- establish, through continuous noise monitoring, representative baseline (pre-project) noise environments at noise sensitive land uses along the corridor;
- estimate construction phase noise exposures at sensitive locations including the noise from actual highway building activities;
- predict any changes in highway traffic noise exposures attributable to the Project, during the 2010 event, in 2018 (10 years after project completion as required by MoT noise policy) and during the 2025 project design horizon year; and
- assess the significance of projected noise impacts from highway construction and operation and, where warranted, identify feasible mitigation measures.

Noise Related to Highway Construction

The communities nearest the proposed construction zones are located at: the southern end of the corridor between Horseshoe Bay and Brunswick Beach; IR#24; and within the District of Squamish. Fourteen of the nineteen sites used for baseline monitoring were placed in these communities at locations the MoT considered representative of sites that will be exposed to maximum levels of noise from Project construction, operations, or both. The MoT conducted baseline monitoring from October 21–25, 2002 and, for IR#24, from April 5–7, 2003.

Project construction will require the use of extensive night time construction activities and this greatly increases the potential for community noise impacts. The MoT estimates that the general construction activities most likely to contribute to increased noise exposures near the sites used for baseline monitoring are: clearing and grubbing, excavations and rock drilling, retaining wall construction, grading and asphalt paving, pile foundations for bridges and bridge sub-structure and precasts. Rock drills will be used wherever significant excavation and/or widening of highway cuts in rock will be required and the MoT notes that their considerable noise output (assuming two drills active) has been accounted for in the noise assessment section of the Application.

The noise impact assessment assumes that over a typical nine-month phase of the construction program there may be construction activities implemented concurrently within a given 200 metre section of highway. In these cases overall noise emissions in that section of highway will increase. While the MoT cannot currently predict to what degree two or three construction phases can coexist within a single 200 metre highway section, it conservatively assumes there will be overlap and treats noise emissions from concurrent activities as additive. The MoT predicts that the middle years of the construction phase, from 2005 to 2007, will involve the greatest construction noise exposure along the corridor while 2003, 2004 and 2009 will be relatively quiet years.

Table 4-3, Volume 3, Section C (p.30) of the Application estimates the range of construction noise from concurrent construction phases and concurrent phases along a contiguous 200 metre section of the alignment. Given the volume of construction work scheduled for nighttime hours, the MoT estimated the potential for construction noise to interfere with human speech and sleep. The Application reports that speech interference occurs outdoors at a separation of one to two metres when intrusive noise levels approach or exceed 60 dBA. The degree of interference increases with the level and duration of the noise. Indoors, some speech interference may begin when noise levels outdoors at the house facade reach the 70 to 75 dBA. Table 8 summarizes the potential of general outdoor noise levels to interfere with speech and sleep.

Figure 2 - Common Levels of Noise in a Community

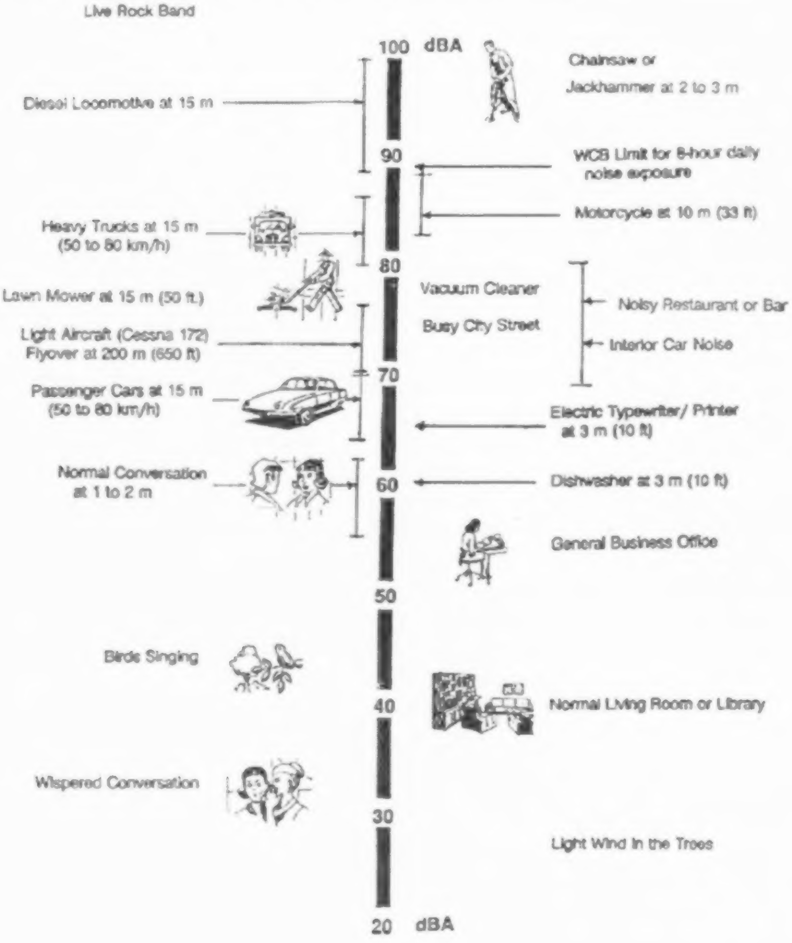
Live Rock Band
100 dBA
Chainsaw or
Jackhammer at 2 to 3 m
Diesel Locomotive at 15 m
90
WCB Limit for 8-hour daily noise exposure
Heavy Trucks at 15 m (50 to 80 km/h)
Motorcycle at 10 m (33 ft)
80
Lawn Mower at 15 m (50 ft.)
Vacuum Cleaner
Noisy Restaurant or Bar
Busy City Street
Light Aircraft (Cessna 172) Flyover at 200 m (650 ft)
Interior Car Noise
70
Passenger Cars at 15 m (50 to 80 km/h)
Electric Typewriter/ Printer at 3 m (10 ft)
Normal Conversation at 1 to 2 m
60
Dishwasher at 3 m (10 ft)
General Business Office
50
Birds Singing
40
Normal Living Room or Library
Whispered Conversation
30
Light Wind in the Trees
20 dBA

Table 8 - Potential Severity of Human Activity Interference Impacts in Residential Areas Associated with Various Levels of Outdoor Noise[3]

Average Outdoor Noise Level L_{eq} (dBA)	Speech Interference			Sleep Disturbance (Indoors)	
	Outdoors	Indoors			
		Windows Open Slightly	Windows Closed	Windows Open Slightly	Windows Closed
30 – 40	None	None	None	None	None
40 – 50	None	None	None	Threshold	None
50 – 60	Minor	None	None	Minor	Threshold
60 – 70	Moderate	Minor	None	Moderate	Minor
70 – 80	Major	Moderate	Minor	Major	Moderate
80 – 90	Severe	Major	Moderate	Severe	Major

To estimate community reaction to construction noise levels, the MoT extrapolated from a study by the U.S. Environmental Protection Agency that synthesized 55 case studies of community reaction to *new* noises introduced to urban residential neighbourhoods. The study categorized potential community reactions into five types depending on the degree to which the existing community noise levels were increased or decreased by the new noise:

Category I	No Reaction (although noise is generally noticeable)
Category II	Sporadic Complaints
Category III	Widespread Complaints
Category IV	Strong Appeals to Local Officials
Category V	Vigourous Action

The predictions of community reaction to Project construction noise, based on the monitoring data collected at the sixteen baseline sites, are summarized in Table 5-3 of Volume 3C of the Application. The MoT predicts that at residences nearest to construction activities, average outdoor construction noise levels will exceed Leq 70 dBA with some regularity and will occasionally, if the setback distance involved is very small, exceed Leq 80 dBA. The MoT reports that there is substantial potential for community noise impact due to speech interference and sleep disturbance within localized residential enclaves closest to the highway alignment and that sleep disturbance will be of substantial concern where major construction activities are conducted near residential enclaves during the night time construction window – particularly between 22:00 and 05:00 hours.

The findings suggest that the anticipated levels of negative community response will be high during some, if not all, phases of highway construction. The MoT reports that at many locations, the highest negative response ratings result from noise associated with pile driving or excavation works (with or without rock drills) in combination with very limited setback distances. In all cases the projected community response is strongly influenced by the fact that seven of the twelve daily construction hours are at night (between 22:00 and 07:00 hours). While the

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[3] Equivalent Sound Level (Leq): This is the steady sound level which, over a given time period, would result in the same sound energy exposure as the actual time-varying community sound level. *Where night time noise levels are generally much lower than daytime levels* (e.g. most highway noise situations), Leq(24) is an appropriate measure of community noise exposure. The Canada Mortgage and Housing Corporation (CMHC) has identified a daily average exterior noise level of Leq(24) 55 dBA to represent the threshold above which road and rail noise can begin to interfere with essential activities such as outdoor speech and indoor sleep.

MoT expects that excavation work will generally proceed during both the day and night, the MoT also notes there may be potential to restrict pile driving to daytime hours, particularly where this latter work would not itself disrupt highway traffic.

Mitigation of Construction Noise Impacts

The Application identifies several approaches to reducing the potential impacts of highway construction noise on the community and minimizing adverse community reactions. Physical noise control measures can be applied at three points: the noise source; along the sound path from source to receiver; and at the receiver (i.e. the residences).

Management and Educational Controls of Noise at the Source avoids creation of unnecessary noise through the management of the construction site, scheduling of activities and the education of both construction crews and the potentially affected communities. It may include limiting construction activities to normal daytime or early evening hours (preferably 07:00 to 20:00 hours), notifying affected communities of the nature and likely duration of any particularly noisy operations such as blasting or pile driving, posting construction site speed limits consistent with minimum noise generation, and encouraging quiet construction practices on-site.

Engineering/Operational Controls of Noise at the Source focuses on the appropriate operation, modification/enhancement or maintenance of equipment or processes such as fitting gas or diesel-powered equipment with silencers (mufflers), using the quietest model of equipment or construction techniques, providing the appropriate covers, hoods, shields for all equipment and regular maintenance of all equipment.

Control of Noise Along the Source-Receiver Path considers ways to block the sound path between the noise source and the receiver. An example is the use of noise barriers (usually the line of sight) between a noise source zone and the noise-sensitive receivers. Noise reductions from 5 to 15 dBA may be achieved when individual noise sources are effectively shielded.

The MoT recommends that each of these types of mitigation measures be considered for the Project. The MoT notes that good communication with local communities is also important to help manage construction noise impacts. The Contractor(s) can meet with community representatives to identify the noisiest construction activities within each community and discuss whether these activities can be conducted during normal daytime working hours. For construction activities that must be done at night, proposed measures to minimize noise should be discussed with the community and agreed upon. The contractor(s) should communicate with the affected communities on a regular basis to advise them well in advance of the types of activities that will take place and notify them of changes in the estimated start and/or completion dates for the various phases of construction.

Noise Related to Highway Operations

To assess potential noise impacts from highway operations the MoT modeled and compared the expected increases in traffic volumes to 2025 and during the 2010 Olympics with 2001 traffic volumes. Although single louder noise events may result from the exhaust systems or engines of passing vehicles, the primary source of noise from vehicles traveling a highway is tire noise.

In November 1993, the MoT adopted a ˇRevised Policy for Mitigating the Effects of Traffic Noise from Freeways and Expresswaysˉ. (The summary of the policy is posted on the EAO Website). The policy states that mitigation measures will be considered and carried out if found feasible, cost-effective and widely supported by the affected residents, if and where, ten years after completion of a MoT freeway or expressway project, the predicted total (project plus baseline) community noise level, expressed in terms of Leq(24)[4], is:

- between 55 and 65 dBA, and exceeds the corresponding pre-project (baseline) noise level by an amount which varies from 10 dBA at a pre-project level of 45 dBA, to 3 dBA at a pre-project level of 62 dBA; or
- 65 dBA or more and exceeds the corresponding pre-project level by at least 3 dBA.

The Project is not classified as either a freeway or expressway which means it is not formally subject to the MoT noise mitigation policies, however the MoT chose to use the policy as a guideline for mitigation of potential noise impacts from Project operations. The MoT predicts that noise from traffic volumes during Project operations will not reach the threshold for mitigation as set out in the MoT's noise mitigation policy. The MoT acknowledges that traffic noise levels at the facades of some residences fronting Highway 99 already exceed those considered (by the CMHC and U.S. EPA) appropriate for residences as normally constructed.

The MoT policy also contains a noise exposure limit for schools based on the noise levels created by highway traffic inside exposed classrooms. Mitigation measures are to be considered if, during normal school hours, the Leq (1 hr) exceeds 47 dBA inside the classrooms. To reach this threshold level indoors, outdoor traffic noise levels near the façade of the school would typically need to reach 60 dBA or more.

To be considered cost-effective under the MoT policy, mitigation measures generally need to provide a predicted noise reduction of 5 dBA or more at front row, ground floor noise receiver locations and have an installed cost of not more than approximately $15,000 per effectively-protected residence. Final rulings as to whether such mitigation is practical and cost-effective in a given project situation are made by MoT project management.

The MoT predicts that with the modest projected traffic volume growth and the generally minor widenings and/or alignments changes planned, the effects of the Project on Highway 99 traffic noise levels at adjacent residences will be uniformly small. The MoT notes that exceptions may occur at Site 10 (Porteau Cove Provincial Campsite) due to the possible effects of traffic detoured onto the BCR Rail alignment during the 2010 Olympic event but predicts the temporary increase in community noise during this period would remain below the MoT policy threshold for mitigative measures.

Working Group Review of the Application
An expanded description of the written comments submitted by the SEWG members on noise issues is presented in the Issue Tracking Table in Appendix 1B of this Assessment Report. Health Canada focused its review on impacts from Project construction. Other working group comments focused on noise related issues from Project operations.

Health Canada
Health Canada noted the potential for disturbance from noise during the night time construction period and advised that all construction equipment should be as quiet as possible and if practicable, the quietest possible type of pile driver employed for night time use near residences such as site #3 (Ansell Place) where construction noise Ldn is predicted at 86 dBA.

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[4] Leq(24) is a single-number descriptor of a community's average sound energy exposure over a 24-hour day. The Leq(24) is commonly used to describe noise environments from road and railway noise.

The MoT has advised Health Canada that the MoT will comply with Health Canada's requirements to keep noise levels within specified thresholds. At locations where noise could be disruptive to residents and businesses, additional measurements and assessment will be undertaken during the detailed design phases of the Project in order to finalize noise predictions, confirm mitigation requirements, and design noise reduction measures where necessary. Construction contractors will be required by the terms of their contracts to take measurements of noise levels and to ensure that noise levels comply with established objectives for daytime and night time work, as part of the EMP for the Project.

Health Canada also noted that the *World Health Organization Guidelines for Community Noise (1999)* recommends an indoor limit of 30 dBA for quasi-continuous noise and 45 dBA Lmax for intermittent noise during nap times for children. There is one daycare located in Lions Bay and one close to the highway corridor at the Totem Hall on the Squamish First Nation's IR#24 in Squamish. The MoT observes that current noise levels near Totem Hall including BC Rail noise events are high and may already exceed these guidelines. To address potential noise impacts the MoT proposes to require its Contractor to develop strategies that will limit Project-related construction noise exposures during nap times. The MoT also proposes to consider means to mitigate the impacts from operational (traffic) noise in the town of Squamish as part of the detailed design phase of Work Package 5.

There are no MoT policy requirements to control or follow-up, through field supervision and/or monitoring, the noise levels created during highway construction activities. However, during past major projects the MoT has required construction companies to adopt a noise control plan to minimize the disturbance of adjacent neighbourhoods. The EAO recommends that the MoT implement a similar noise control plan for the Project.

Lions Bay

The Village of Lions Bay representative to the working groups noted extensive community concern about potential noise impacts to the community. These concerns were also presented to the MoT by the Lions Bay CAG and in response the MoT carried out additional community consultations in January and February 2004 and reported the results in the Lions Bay Clarification *Report*.

Lions Bay questioned the reliability of the baseline noise measurements used by the MoT for the noise impacts assessment. The MoT subsequently recruited a third-party independent expert to conduct a thorough review of the existing noise data collected , the data collection methods and instrumentation, and the Traffic Noise Model files and approach used for the noise prediction and abatement evaluation. This review included a careful tour of the study area to examine the unique geometry of Lions Bay and review the sites where noise measurements were conducted.

The independent review[5] found that noise measurement sites were appropriately selected, methods were professional and followed applicable standards, and all of the data collected, except for one site, appears to be reasonable and valid. The report recommended that the noise measurements at this one site (190 Panorama Road) be re-done and that the MoT conduct noise measurements at several additional sites in the study area, including some elevated decks that have frequent human use during good weather. The report concluded that the traffic noise modeling used to predict noise impacts from the Project and consider mitigation measures was reasonable and appropriate and it recommended that if noise abatement options being considered for the Lions Bay community proceed toward design and construction, more detailed and complete traffic noise modeling of the terrain, receivers, barrier and roadway geometry be completed. The MoT will carry out additional noise measurement and modelling as the Project moves through preliminary design and continue to work closely with the community.

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[5] See memo from Christopher W. Menge to John Cavanagh of January 23, 2004 (attached to the Lions Bay Clarification Report).

Other identified concerns in Lions Bay and Brunswick Beach were:

- use of construction detours at Brunswick Beach;
- expanding from existing two lanes to four lanes through urban Lions Bay;
- merging four lanes back to two lanes near Brunswick Beach; and
- speeding through the community.

The MoT subsequently revised its construction plans to remove the need for a construction detour near Brunswick Beach and informed the EAO of this change on April 13, 2004. The transition point from four lanes to two lanes will be moved north of Brunswick Beach to "M" Creek to reduce potential noise impacts. The MoT has also committed to work with the community to reduce current highway noise by 4 to 5dB through mitigation measures such as open graded asphalt and speed reduction and to work with the community to make best efforts to incorporate noise barriers and other noise mitigation efforts where effective, which could result in a further 5dB reduction. The Village of Lions Bay would like to see open graded asphalt used for the entire length of the alignment through the Village.

The MoT proposes to mitigate speeds within the community with additional lighting and traffic calming measures such as a pedestrian pathway, lamp standards and landscaping to increase driver awareness of the Village of Lions Bay, thereby reducing speed and noise. MoT has also committed to consult with the police and the RCMP to determine if there are ways the MoT can facilitate more effective speed enforcement through design measures such as additional pullouts for enforcement use.

IR#24

The Squamish Nation noted that while the MoT has assessed the potential for increased noise from Project operations, it uses existing traffic noise levels as the baseline and does not consider the impact of existing noise levels. The Squamish Nation is concerned about potential noise impacts to people living on IR#24 from Project operations and requested that the MoT examine the use of other sound-reducing mitigation measures on IR#24 additional to those set out in the Application. The MoT has committed to additional analysis of noise impacts and mitigation measures on IR#24, in cooperation with the Squamish Nation, during the detailed design phase when the physical characteristics of the alignment are better defined. The MoT will consider the use of open graded asphalt, traffic calming and other viable options in consultation with the Squamish Nation.

District of Squamish
The District of Squamish noted that widening of the highway and increasing traffic volumes have the potential for increasing ambient noise levels at properties adjacent to the highway. Baseline noise data should be collected throughout the urban portion of the corridor and measures such as speed control, pavement type and buffering should be enlisted to maintain or reduce noise from present base levels. The MoT reports that it will work closely with the District as the Project moves to preliminary design.

Conclusion
During this cooperative environmental assessment the EAO, DFO and EC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO and EC are satisfied that the Project will not result in significant adverse effects from noise during Project construction or operation.

12.4 EMERGENCY SERVICES

Volume 3, Section A of the Application provides baseline information on emergency services in the highway corridor (ambulance, police and fire services).

The MoT predicts that once completed, the Project will improve travel times on the highway which will also benefit ambulance, police and fire services. Vehicle accident rates for the corridor are expected to drop to the provincial averages for similar sections of highway resulting in an estimated $517 million in accident cost reductions.

During Project construction, ambulance services will be affected by intermittent delays and night time closures. To mitigate impacts the MoT proposes to:

- communicate with the public in communities affected by construction so they factor construction delays into their decisions (e.g., where to go for care or whether to call an ambulance);
- maintain access to one highway lane for emergency vehicles to the extent possible; and
- work with the B.C. Ambulance Service to ensure access to helicopter services are available if required.

The MoT predicts minor impacts to police services from highway closures and delays during Project construction and notes that policies and procedures are already in place generally for dealing with such closures and delays. Some construction delays and closures could temporarily restrict RCMP access to Lions Bay but the MoT reports that the RCMP could draw on West Vancouver Police in such circumstances and existing protocols would provide for this. To mitigate the impact of closures and delays on police services the MoT proposes to:

- work with the RCMP to map high frequency crash areas to construction areas so that the RCMP can identify in advance those high-incidence areas that require RCMP response and for which access may be restricted due to construction; and
- maintain (as much as possible during construction) one lane that can be accessed as necessary by police vehicles.

Project construction will have some impact on fire protection services due to the location of some highway closures and the requirement to provide first response services on stretches of the highway between jurisdictions. For some communities, neighbouring fire protection services would temporarily need to service an area that traditionally has been outside their scope of services. Fire protection services in the communities of Lions Bay, Squamish, and Whistler will be most affected by intermittent highway delays and road closures. Pemberton and Lillooet will be unaffected.

The MoT reports that fire and rescue services already have measures in place to deal with closures and delays on the highway, and the schedule for delays or closures is communicated routinely by transportation authorities to fire protection services. Neighbouring fire rescue services have defined, formal divisions of territory for coordinated dispatch and first response capability. The MoT predicts that fire protection services will be able to adapt to construction related delays and closures. To mitigate construction impacts to fire protection services the MoT may:

- develop communication protocols between construction site(s) and fire protection services dispatchers to ensure that fire protection services are able to get to the front of traffic queues during delays and that neighbouring fire protection services are able to access service areas during times of temporary closures; and
- maintain (as much as possible during construction) one lane that can be accessed as necessary by fire protection services vehicles.

Working Group Review of the Application

An expanded description of the written comments submitted by the SEWG members on emergency service issues is presented in the Issue Tracking Table in Appendix 1B of this Assessment Report. The working groups had no additional comment on the MoT's plans for managing Project construction and impacts to emergency services and focussed instead on the potential impacts of Project operations.

The District of West Vancouver estimated that original overland and tunnel designs presented in the Application could increase emergency response times by up to ten minutes. The MoT subsequently revised the design of the alignment through West Vancouver and presented these changes in the West Vancouver Clarification Report. Option B and Option D are both designed to eliminate potential delays to emergency response times.

Of the communities along the corridor with emergency fire services, the Village of Lions Bay is nearest to the section of highway that is not slated for improvement as part of the Project (Brunswick Beach to Porteau Cove). The Village of Lions Bay notes that although the *percentage* of accidents relative to the total volume of traffic will decrease with the Project, the *total* number of accidents on the highway may increase with rising traffic volumes and this will increase pressure on the Lions Bay fire department to be a first responder to emergencies between Lions Bay and Porteau Cove.

This has financial implications for the residents of the Village of Lions Bay in the form of increased operational costs for its fire department as a result of the Project. The Village of Lions Bay believes these costs should not be absorbed by the community. The environmental assessment process is not the appropriate mechanism to resolve this issue, however the EAO acknowledges that this is a potential adverse impact of future Project operations.

Conclusion
During this cooperative environmental assessment the EAO, DFO and EC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO and EC are satisfied that the Project will not result in significant adverse effects to emergency services.

12.5 RECREATION

The potential impacts of the Project on upland recreation are described and assessed in Volume 3, Section E (and Appendices) of the Application. The MoT considered Project impacts to various recreational uses of the corridor including scenic motor touring, Provincial park visits, bicycle touring, rock climbing and backcountry recreation.

The MoT concludes that avoidance and mitigation strategies can effectively address most potential Project impacts to recreation but there will be adverse effects on recreation values at four provincial parks. Porteau Cove Provincial Park will be impacted during Project construction if used as a barge loading site. Construction may also require blasting within Murrin Provincial Park which may impact the recreational experience for rock climbers. The Project alignment will encroach upon Shannon Falls Park and Brandywine Park and an Order-In-Council will be required to adjust the park boundaries to accommodate the new right-of-way.

To facilitate review of recreational issues the MoT created a recreational focus group that includes participation from West Vancouver Parks Department and various cycling, hiking and rock climbing associations. The group has met three times between November 2003 and March 2004 to discuss Project impacts on recreational features along the highway corridor, identify appropriate mitigation measures where possible and ensure that the MoT's uplands recreation assessment captures the majority of concerns and issues from the recreation community at large.

Working Group Review of the Application
An expanded description of the written comments submitted by the SEWG members on recreation issues is presented in the Issue Tracking Table in Appendix 1B of this Assessment Report.

The District of Squamish notes that Squamish is a world renowned destination for rock climbing and wind surfing and it is important that the Project enhance their exposure and usage. Safe access and ample parking for the Murrin, Malamute and Chief venues should be a design priority.

The SLFN expressed several concerns about the issue of recreation and the potential impacts of the Project. The SLFN note that the commonly held understanding of recreation (hiking, biking, camping) and use of the backcountry is often in conflict with the First Nations access to or use of spiritual, sacred sites, hunting, or plant gathering. The SLFN expressed the view that increases in recreational activity has already reduced wildlife and plant populations, and further growth associated with the highway will worsen this problem.

Conclusion

During this cooperative environmental assessment the EAO, DFO and EC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO and EC are satisfied that the Project will not have a significant adverse impact on recreation.

12.6 AESTHETICS

Background

Volume 3, Section I of the Application describes the measures taken or proposed to identify and address Project aesthetics in the Highway 99 corridor. The MoT developed a Context Sensitive Design Engineering Practices report in November 2002 to provide a general inventory and assessment of the visual, aesthetic, and cultural attributes of the corridor. The report established a series of principles, guidelines and practices to inform the consistent and sensitive treatment of views, roadway structures, and facilities along the corridor.

The MoT's overall design goals for the entire corridor are to:

- maximize visual quality of the corridor, both from the highway and to the highway (opportunity exists to significantly enhance the current conditions);
- use aesthetic design treatment to maintain driver interest and attentiveness, and thereby encourage safe driving;
- provide aesthetic unity and character for the entire corridor while respecting and reflecting the unique landscape character, culture, and ecology of the corridor; and
- provide portals announcing the beginning and ending of the highway, as well as markers at important segments and transitions within the highway.

The MoT reports that at the detailed highway design stage there is considerable opportunity to incorporate measures that will improve the visual quality of the corridor and the corresponding aesthetic experience of those using the corridor. The MoT will retain landscape architects or equally qualified professionals to provide consulting services and use a consultative community process to refine the list of important features and to determine precisely how they should be highlighted.

Working Group Review of the Application

The Squamish and Lil'wat Nations are concerned that the visual effects of the highway upgrade on the aesthetic quality of their respective asserted traditional territories be examined by the MoT. The Squamish Nation would like to know what the highway will look like, particularly in areas of large rock removal which affect the appearance of the territory and areas of cultural importance. The Lil'wat Nation noted that some sites are used for spiritual bathing and there are transformer rocks within their territories that should be identified, protected and respected.

In its response to First Nation concerns, the MoT advised that the Application did offer specific descriptions of potential highway impact on the aesthetics of the corridor because design work was ongoing. The Context Sensitive Design Engineering Practices report includes the preservation of aesthetic resources. The MoT has committed that there will be conscientious level of aesthetic treatment for the Project. These issues were discussed at the SEWG meeting of March 3, 2004. The Squamish Nation has since provided information to the MoT on unidentified cultural landforms along and adjacent to the highway corridor so that the MoT can prepare conceptual visual representations of impacts at any strategic locations. This can be completed after the environmental assessment review but prior to the start of construction.

The District of Squamish noted the MoT do not yet have a landscape architect to ensure the highway aesthetics are acceptable and would like to see additional aesthetics within Squamish as well as its vicinity. The MoT has committed to commission a landscape design consultant to work closely with the District of Squamish on the urban Squamish section of the highway improvements. The District of West Vancouver reported at the SEWG meeting of April 20, 2004 that it has also requested an assessment of the aesthetic impacts of Option B.

Conclusion:
During this cooperative environmental assessment the EAO, DFO and EC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO and EC are satisfied that the Project will not have significant adverse aesthetic impacts.

12.7 ECONOMIC

The Project will have economic impacts during construction and operations. Based on a construction cost of $600 million, the Project is estimated to generate $471 million of gross domestic product (GDP) with $240 million in direct GDP, $132 million of indirect GDP and $99 million of induced GDP (consumer re-expenditure of wages). The MoT estimates that Project construction will support 8,300 person years of employment, with 4,100 person years of direct employment, 2,400 person years of indirect employment and 1,800 person years of induced employment. The Project will result in about $183 million in federal, provincial, and municipal government revenues comprised of $162 million in direct and indirect government revenues, and $21 million in induced government revenues.

During the peak of construction, the Project will employ an estimated 1,400 workers which represents approximately 30 percent of the road construction work force in the greater Vancouver area. The MoT notes that within the GVRD there is a plentiful supply of construction workers and the vast majority of work sites are within a manageable distance to commute on a daily basis. There is a stock of reasonably priced hotels in the Squamish area so a modest requirement for housing for construction labour would likely be accommodated within the community. The MoT predicts that the majority of the construction workers on the Project will reside within commuting distance of the Project and that a construction labour camp will not be required.

The Project construction phase will have a limited and temporary negative economic impact on the Resort Municipality of Whistler producing a 0.3-2.4 percent decline in annual tourist spending. The $471 million in increased GDP as a result of construction activities will offset a portion of the potential drop in tourism activity in the Highway 99 corridor.

Tourism operations located along other parts of the corridor will face impacts similar to the tourism operations in Whistler, in proportion to their distance from Vancouver. The MoT will implement a Traffic Management Plan to help minimize construction related impacts on tourism in the corridor. The MoT has already committed that there will be no road closures for Project construction between November and February to accommodate the winter season at Whistler.

Working Group Review of the Application

An expanded description of the written comments submitted by the SEWG members on economic impacts is presented in the Issue Tracking Table in Appendix 1B of this Assessment Report. The Ministry of Small Business and Economic Development participated in the socio-economic working group review of the economic information presented in the Application. There were no concerns expressed about the predicted economic impacts of Project construction. The SLFN commented that although Project operations are predicted to result in $297 million in increased economic activity between 2010 and 2025, most of this activity is associated with the predicted increase in population in the corridor and it is unclear how much of this benefit might accrue to the First Nations.

Conclusion

During this cooperative environmental assessment the EAO, DFO and EC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO and EC are satisfied that the Project will not have a significant adverse economic effect.

12.8 LAND USE IMPACTS

As part of its socio-economic assessment, the MoT considered the Project in the context of existing land use plans including the Livable Region Strategic Plan (LRSP) and the Official Community Plans for West Vancouver, Lions Bay, Squamish, Whistler, Pemberton and Lilloet. Volume 3, Section A, 6 and 9 consider the impacts of Project construction and operation on land use in the corridor. The Application also reports on the requirements for Crown land from provincial parks along the current highway. Land use impacts on First Nations were reported in the AIUS and will be addressed in accordance with the *Provincial Policy for Consultation with First Nations* (October 2002).

The LRSP of the GVRD defines a growth strategy for the Lower Mainland that focuses future growth on the Burrard Peninsula, the North-East Sector, North Surrey and North Delta. Individual communities have established their own development plans in relation to the LRSP. The MoT reports that when compared to the predicted 1.1 million increase in population in the Lower Mainland between 2001 and 2025, the projected growth in population in the highway corridor as a result of the Project (10–11,000 people) will be relatively insignificant. The MoT also notes that most of the growth in the highway corridor will occur outside of the boundary of the GVRD, is not directly subject to the provisions of the LRSP and will not have a significant impact within the GVRD. The incremental traffic generated in the GVRD by the Project will amount to between 1,000 to 1,500 vehicles per day by 2025 which represents less than 1 percent of existing traffic on the First and Second Narrows bridges (19,990 – 177,000 vehicles per day).

The MoT predicts that construction activities will not have a significant impact on population growth in the corridor. The MoT also states that to date the Project has not encountered significant conflicts with existing OCPs and land use plans and that the Technical Liaison Committee (TLC) and Community Advisory Groups (CAG) are expected to deal with ongoing matters related to the integration of the Project with official community plans and land use plans.

Working Group Review of the Application
An expanded description of the written comments submitted by the working group members on land use issues is presented in the Issue Tracking Table in Appendix 1B of this Assessment Report. Working group concerns with construction impacts on land use focused on recreation sites and trails and are discussed in Section 12.5 of this Assessment Report.

The Squamish and Lil'wat Nations are concerned about the potential impact to use of their traditional territory from the population growth predicted to result from the Project. The First Nations also comment that the increased development of auto-dependent bedroom communities, where residents must drive long distances to and from work every day is inconsistent with the vision, policies, and goals of the Liveable Region Strategic Plan adopted by the GVRD and all of its member municipalities, and of the Squamish Nation's *Xay Temixw (Sacred Land) – Land Use Plan* and the *Lil'wat Cultural, Heritage, Resource, Protection Plan*. The SLFN expressed the view that indirect and induced effects of the highway on their traditional territory (particularly population growth, development, and backcountry recreation) should be included in the assessment.

The Squamish Nation also expressed concern to the working group that when current housing construction at Capilano is completed all reserve land will be utilized to capacity except that in the flood plain. Many Squamish Nation members live off reserve and many would like to return to live within Squamish Nation communities but there is no room to accommodate them. It is important to the Squamish Nation to be economically self-sufficient. The Squamish Nation is concerned that it does not have the capital to participate in increased economic activity and is therefore placed at a disadvantage. The Lil'wat Nation shares these concerns.

The EAO notes that the Squamish and Lil'wat Nations have since negotiated Accommodation Agreements-in-Principle with the Province and wrote to the EAO in March 2004 to advise that these agreements-in-principle resolve the outstanding issues of consultation and accommodation with respect to the Project.

Conclusion:
During this cooperative environmental assessment the EAO, DFO and EC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO and EC are satisfied that the Project will not have a significant adverse impact on land use.

13. NAVIGATION

No significant issues related to navigation were identified during the review of the Application. Transport Canada has advised that the Navigable Waters Protection Division would prefer that the Mamquam Blind Channel bridge be rebuilt as a clear span bridge with no reduction in overhead clearances and would like the MoT to provide any plans available for the existing Culliton Creek bridge since at the time it was built the creek was declared non-navigable. The bridges at Britannia Creek and Daisy Lake Channel have not been previously approved by the Navigable Waters Protection Division. Any changes to bridges over navigable waters will require approvals from Transport Canada.

14. EFFECTS OF THE ENVIRONMENT ON THE PROJECT

The CEAA requires that environmental assessments include consideration of the effects of the environment on the project. In Volume 1, Section C5 of the Application the MoT assesses the potential risks to the construction, operations or maintenance of Project from the environment.

The primary risks identified by the MoT are debris flows, floods earthquakes, rock falls and snow avalanches.

Debris Flows
Information is available on the areas along the corridor with the potential for debris flows including studies by Thurber Consultants (1983) and Klohn Leonoff (1992). Between 1969 to 1991 there were 18 debris flow events resulting in a number of direct and indirect deaths as well as property damage. The direct deaths resulted from debris impacting dwellings in residential communities while deaths on Highway 99 were not the result of direct impact from debris.

North of Squamish, three creeks, Cheekye, Rubble and Miller, have a history of debris flows or debris floods. The existing Cheekye Bridge has been identified at risk should there be a repeat of the debris flow recorded in 1958. The MoT reports that the solution is to raise the grade when the structure is replaced and continue with progressive alert procedures in the interim. Debris floods on Rubble Creek pass beneath the existing structure but require maintenance to re-establish the channel depth. Miller Creek had in channel works undertaken following a debris flow several decades ago. There have not been subsequent events.

In the 1980ꞌs, protective structures and creek channelization works were constructed on Alberta, Harvey, Magnesia, Charles and Newman creeks. Further debris flow protection works of lower priority were identified in the 1983 Thurber and 1992 Klohn Leonoff reports. The most significant debris flow hazards remaining to be addressed are on Kallahne, Sclufield and Unnamed #1, #7 and #8 Creeks.

The strategy adopted by the MoT, to mitigate risk from debris flows, combines construction of barrier walls at selected locations where existing natural catchments can be effectively enhanced, with ongoing management of debris flow risk through continuation of the existing MoT progressive alert program (Ref: Volume 1, Section C - Table 5-1 of the Application). Each year between October 1 and March 31 the MoT local staff assess and monitor the increasing hazard conditions of Hwy 99 north of Horseshoe Bay. A Yellow Alert is issued when a heavy rain warning (> 50mm in a 24-hour period) is issued by Environment Canada, when weather observations from MoT weather stations and patrol reports validate the forecast, and when creeks begin to show signs of saturation and discolouration. During a Yellow Alert, mobile patrols monitor creeks and weather conditions and provide hourly reports. A Red Alert is issued when the heavy rainfall warning continues, when observed heavy rainfall is occurring and when creeks are saturated with varying degrees of discolouration. During a Red Alert the highway is closed to all traffic.

Floods

The MoT's Highway Engineering Design Manual, Supplement to TAC Geometric Design Guide dated February 2001 describes the design measures used to manage the risk to the alignment from floods including:

- designing bridge hydraulics to the 200-year return period peak flow;
- designing culvert hydraulics to the 100-year peak flow return period or, where damage due to a major flood would be critical to the 200-year return period; and
- criteria for the construction of embankments such as stream and ditch banks, bridge end fill slopes, and culvert inlets and outlets.

Earthquakes

The MoT's standard regarding seismic design is described in the memorandum issued by the MoT's Bridge Engineering Branch in June of 2000, titled "Revised Seismic Design Requirements for New Bridges in British Columbia". Structures are also designed to meet the Canadian Highway Bridge Design Code CAN/CSA-S6-00. Retaining wall design considers seismic induced loading, and retaining walls are also generally designed to CAN/CSA-S6-00 requirements. For design cases not specifically covered by these criteria, design will be in accordance with Project-specific design requirements developed in consultation with the MoT. The MoT will design and construct new bridges, overpasses and other structures to prevailing standards to provide post-seismic serviceability in the event of a 1 in 475 year return seismic event. Where existing structures are modified, the appropriate level of seismic upgrade will be incorporated.

Rockfalls and Slope Failures

Widening along the existing grade, as is anticipated from Sunset Beach to Lion's Bay and possibly Lion's Bay to Minaty Bay, will present the challenge of either extensive, high rock cut excavation to the east or construction of side hill embankment fills, retaining walls and pile supported structures on the west side.

Rock fall catchments for many of the existing cuts is minimal and substantially less than current design practice would recommend. A program of rock slope stabilization has been ongoing over the past 30 years to address rock fall/slide problems and has resulted in a significant improvement in the stability of the existing rock cuts.

The MoT's Technical Bulletin GM02001 sets out the standards to be used for new rock cuts for the Project. Project work will address rock fall issues from Sunset Beach to Lion's Bay. If the BC Rail line is used as a third traffic lane for the 2010 Olympics, the MoT notes that some additional rock slope stabilization could be required.

The risk of slope failure may exist with highway cut and fill slopes. The Application describes the primary causes of slope failure and the measures used to mitigate the risk. Particular care is required during highway construction to protect both the traveling public and workers from the associated risks of slope failures. The risks are most prevalent during construction because slopes may be temporarily steeper than their natural angles of repose and are more susceptible to erosion due to their non-vegetated states during construction. These risks are alleviated by temporary shoring of slopes, using techniques such as soil anchoring, shotcrete, mesh, temporary retaining walls and other methods. They are used on a site-specific basis. The Workers Compensation Board (WCB) requirements deal with construction site slope stability issues and when their requirements cannot be met (i.e. due to spatial restrictions), the contractor is required to develop engineered solutions to ensure that safety standards are met.

The MoT concludes that the rock stabilization program and improved design standards for new rock cuts will mean a reduction in current levels of rockfall on the highway once the Project is completed. Slope failure hazards will be managed through accepted engineering practices, compliance with WCB regulations and continued standard highway maintenance procedures.

Snow Avalanches

The MoT conducted an assessment of the risk to the Project from snow avalanches in accordance with the Canadian standards for avalanche mapping, as outlined in the ˇGuidelines for Snow Avalanche Risk Determination and Mapping in Canada˜ and the ˇLand Managers Guide to Snow Avalanche Hazards in Canada˜, both prepared by the Canadian Avalanche Association and in 2002. These documents define the typical thresholds to initiate action for highway corridors as avalanches with a size Class > 2 and a return period of 30 years or less. Size 2 avalanches are large enough to bury, injure or kill a person while those greater than Size 2 have (as a minimum) the potential to bury a car, destroy a small building or break a few trees. In its investigation, the MoT identified no significant avalanche hazards along the existing Highway 99 corridor between Horseshoe Bay and Function Junction. Several large avalanche paths are located above the highway on the east side of the corridor south of Squamish. Avalanches in these paths typically stop well above the existing alignment. Sloughing has been recorded from some of the steep cut slopes along the highway, and will be expected to continue in the future. Expansion of the existing highway and addition of new lanes in the split grade alternative areas may create additional areas prone to sloughing. The MoT predicts it can mitigate this operational concern by designing sufficiently large ditches to minimize sloughing of snow onto the highway in these areas or enlarging existing ditch catchments by increasing the height of the road shoulder.

Rubble Creek Land Hazard (RCLH) (formerly known as the Garibaldi Civil Defense Zone)

North of Cheakamus Canyon, the existing highway traverses the RCLH – a zone of elevated natural hazards relating to the geological history of the area. The RCLH extends from approximately the northern end of Cheakamus Canyon to the Pinecrest Estates near Daisy Lake. The Provincial Government created the RCLH by Order in Council in 1981 in response to the risk of reoccurrence of a large landslide (30-36 million m^3) that initiated in 1855 from the Barrier, a 200 metre high cliff composed of rubbly volcanic rock at the head of Rubble Creek. The runout from the landslide and subsequent related debris reached the Cheakamus River Valley and produced the Rubble Creek Fan.

In 2002 and 2003, Golder Associates Ltd. produced a memo for the Project outlining the hazards and risks in the area and a report evaluating the risk to highway users through the RCLH. The report concluded that there are; risks of reoccurrence of a rockslide from the Barrier reaching Highway 99; of wave runup from such a slide entering the Daisy Lake Reservoir; and of independently occurring debris flows.

Based in part on previous work carried out by others, Golder estimates that:

- the annual probability of death for highway users on a daily basis due to such land slide hazards is very low in comparison to other individual risks;
- the annual probability of death for a highway worker due to such landslide hazards is the same as other worker risks and individual worker risk criteria; and
- the societal (collective) risk due to such landslide hazards is low and in compliance with typical societal risk criteria.

The MoT concludes that the probabilities of death on the highway through the RCLH resulting from the RCLH natural hazards are comparable to the probabilities of death resulting from other events which regularly befall travelers and workers.

Review of the Application

An expanded description of the written comments submitted by the BTWG members on the potential effects of the environment issues is included in the Issue Tracking Table in Appendix 1A of this Assessment Report. During the issue scoping stage of the Project, the potential impact of hazards on the Project was identified by the Proponent. Terms of reference for a hazard assessment were prepared as part of the overall geotechnical assessment for the Project. The BTWG reviewed the MoT's assessment of the potential effects of the environment on the Project. The MoT representative to the BTWG was the primary technical reviewer on the issue.

The MoT's designated reviewer commented that the Application, while discussing the potential impacts of flows did not include details of the proposed barrier walls at Disbrow, Sclufield or Kallahne creeks and also recommended that the MoT review the debris flow sites identified by the 1983 Thurber report on a site by site basis for risk and select mitigative measures based on the assessed risk.

The MoT provided a written response and subsequently provided a design drawing on the barrier wall design and clarified that the sites identified in the Thurber study were last investigated as part of the Klohn Leonoff study of 1991. The MoT decisions for the current Project consider both the Thurber and Klohn Leonoff studies along with additional assessment undertaken for the proponent on Disbrow Creek.

The MoT also clarified that Kallahne sites #7 and #8 are in the section of highway (south of Porteau Cove) that will not be widened as part of the current Project and that MoT will assess these sites when designs for four lanes are prepared sometime in the future.

The MoT reported that while the probability of occurrence of a debris flow on Unnamed Creek #1 is indicated as high, there is no recorded history of an event and the design traffic volume is predicted to be low in comparison with creeks such as Harvey, Magnesia and Charles. There is no inexpensive option to improve catchment for Unnamed Creek #1 and the MoT estimates that mitigation at this site would cost $350,000 to $1.8 million.

Environment Canada commented that a 1 in 200 year flood event could inundate the highway in the area of Britannia Beach and noted that the Application does not include measures to address this problem. In response the MoT clarified that a flood mitigation study is underway for Britannia town site under direction of the SLRD with an independent consultant. The MoT will have access to the results of this study. On behalf of MoT, Intercad has undertaken an analysis of the Britannia Creek Bridge in their preliminary design report and commented on the hydraulic capacity of the existing structure and the proposed temporary up-stream bridge.

The Squamish and Lil'wat Nations and the MoT reviewer commented on the potential for increased risk of avalanche or debris flows from logging at elevations above the road. In discussion at the BTWG meeting of December 4, 2003 the MoF clarified that there is limited timber harvesting above the alignment and these operations are subject to MoF policies and the *Forest Practices Code of British Columbia Act* which requires a company to complete a terrain stability assessment before the final decision is made on whether to proceed to log within an area.[6] This measure is designed to minimize the risk of debris flows or avalanches resulting from logging activities.

Conclusion

During this cooperative environmental assessment the EAO, DFO and EC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO and EC are satisfied with the MoT's assessment of, and measures to address, the potential effects of the environment on the Project.

15. ACCIDENTS AND MALFUNCTIONS

Volume 2, Section B5 of the Application provides an assessment of the potential for accidents and malfunctions during Project construction and operation. Spills are the main environmental risk from an accident either during Project construction or operations.

The MoT's *Standard Specifications for Highway Construction*, Section 165, "Protection of the Environment" (Volume 1 Appendices), establish contractor responsibilities for environmental protection during construction and will be supplemented by Special Provisions that describe local conditions and special requirements. These may include lists of Designated Streams and Designated Environmentally Sensitive Areas, specific in-stream work windows, specific contacts and other Project or site-specific information.

The proponent recognizes that the highway crosses important fish-bearing waters and sensitive areas and understands that safeguards must be implemented to protect these systems from spills. The *Standard Specifications for Highway Construction* specifies contractual requirements for the transport, servicing and operation of equipment. In addition to these requirements, the Contractor will develop contingency plans describing alternative or back-up plans in the event of a spill, environmental emergency or failure of any of the protective measures. The Contractor will be required to prepare contingency plans for the clean-up of toxic or hazardous spills prior to construction and submit it, together with a list of spill abatement equipment, to be stored on the job site, to the MoT representative for review.

The MoT reports that the Contractor must immediately report any spill of any toxic or hazardous material verbally to the Ministry representative and the Provincial Emergency Program. The

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[6] The *Forest and Range Practices Act* was brought into force January 31, 2004 to replace the *Forest Practices Code of British Columbia Act*. The new legislation includes a results-based focus that includes strengthening the role of resource professionals in the development and delivery of credible and workable resource management strategies.

Contractor must immediately take the necessary steps to abate the discharge and provide the necessary labour, equipment, materials and absorbents to contain and remove the spill, clean-up the affected area, dispose of waste materials at an approved disposal site, and restore the area to the satisfaction of the environmental regulatory agencies, at the Contractor's expense.

The Contractor must store onsite and use suitable equipment and materials for the mitigation of concrete spills into or in areas adjacent to watercourses.

Operations

During Project operations, the Application notes that the main parties involved with environmental response to fuel spills, floods, debris flows or other natural or man-made events during the operations phase are:

1. Road and bridge maintenance contractor;
2. Ministry of Transportation;
3. Ministry of Water, Land and Air Protection;
4. Provincial Emergency Program (PEP; and
5. Hazardous Materials Contractors (HAZMAT).

Procedures exist for dealing with fuel spills or dangerous goods spills as described in the Ministry's *Emergency Response Plan* book. The road and bridge maintenance contractor is responsible for initial response of any event that occurs on the highway. Small fuel spills contained to the highway pavement are routinely cleaned up by the contractor and reported to MoT. The maintenance contractor also provides initial response to any and all larger spill events. When the spill is >200 litres or has migrated off the highway right-of-way, MoT is contacted, as is WLAP, who then assume control of the situation, may continue to utilize the maintenance contractor's resources and may also utilize HAZMAT contractors. PEP may become involved if the magnitude or intensity of the event is of a size that triggers their involvement.

Potential Accidents and Malfunctions in the Tunnel

The Application states that an operations and incident response plan will be developed for the tunnel and approaches at detailed design modelled on those for the Cassiar and George Massey Tunnels. Procedures will be in place to respond to events such as fire or an accident or dangerous goods spill. The MoT reports that generally the risk of environmental impact due to dangerous goods spills are less severe in a tunnel situation, because tunnel drainage is enclosed. This provides an opportunity to isolate the contaminants before they enter the natural environment.

Conclusion

During this cooperative environmental assessment the EAO, DFO and EC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO and EC are satisfied with the MoT's assessment of, and measures to address, the potential effects of any accidents or malfunctions.

16. CUMULATIVE ENVIRONMENTAL EFFECTS

Background

CEAA requires that every screening include consideration of the environmental effects of any cumulative environmental effects and the significance of any cumulative environmental effects. A cumulative effects assessment must consider any residual impacts resulting from the *environmental* effects of the project after mitigation measures are applied. If these residual environmental effects lead to other effects (socio-economic, health, archaeological) those effects must also be considered in the cumulative effects assessment.

CEAA defines an environmental effect in respect of a project as any change that the project may cause in the environment, including any effect of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by aboriginal persons, or on any structure, site or thing that is of historical, archaeological, palaeontological or architectural significance; and any change to the project that may be caused by the environment.

When the MoT filed its Application in July 2004, it reported that the Project would not result in residual adverse environmental effects to Valued Ecosystem Components after mitigation and compensation were applied and therefore would not have any cumulative effects. Federal Responsible Authorities and other members of the working groups were of the opinion that the Project would have residual adverse environmental effects that should be assessed for their cumulative impact in combination with other existing or imminent projects in the Sea-to-Sky corridor.

The MoT subsequently worked with the RAs to develop a mutually acceptable workplan for the cumulative effects assessment, completed the cumulative effects assessment in December 2003 and submitted a final report in February 2004.

Options B and D in West Vancouver were developed after the MoT filed its cumulative effects assessment. On May 10, 2004 the MoT provided federal RAs with an addendum to the cumulative effects assessment consisting of additional information on cumulative effects included in the *Sea-to-Sky Highway Improvement Project Clarification Report – Horseshoe Bay to Sunset Beach* (April 2004). The MoT examined whether these options have potential for any cumulative environmental effects not previously studied and reported.[7] The MoT concluded that the two options do not measurably change Project impacts on acid rock drainage/metal leachate, birds, air quality and stormwater/water quality. Table 9 summarizes the potential impacts and cumulative effects of Options B and D on common vegetation.

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[7] The two options proposed in Lions Bay did not require further assessment for cumulative impacts because there is no change to Project impacts on Valued Ecosystem Components along this section of the alignment.

Table 9 – Potential Impacts on Common Vegetation and Predicted Cumulative Effect.

	Horseshoe Bay to Sunset Beach Clearing (ha)	STS Common Vegetation Loss (ha)	Cumulative Common Vegetation Loss (ha)	Cumulative loss as % of Squamish Forest District (%)
Option B	13.5	111.3	32,573.3	3.05
Option D	10.1	107.9	32,569.9	3.05

The MoT concludes that the Project does not present a likelihood of significant cumulative adverse environmental effects.

Working Group Review of the Application and Cumulative Effects Assessment
An expanded description of the written comments submitted by the working group members on cumulative effects is presented in the Issue Tracking Table in Appendix 1B of this Assessment Report. The SLFN are concerned that the cumulative effects assessment did not examine the indirect and induced impacts resulting from the Highway 99 upgrade. This concern was particularly related to the effects of population growth and associated development on the First Nations territory and their ability to use their land and water for traditional and contemporary purposes. The SLFN are of the opinion that the cumulative effects assessment for the Project is incomplete because it does not consider:

- socio-economic impacts of induced growth, attendant development and its impacts on First Nations;
- the full scope of all existing development in the Sea-to-Sky corridor including the existing highway; and
- water quality impacts of increased vehicle use of the highway in combination with the hydrocarbon burden on aquatic systems from existing and future development in the corridor.

The Canadian Environmental Assessment Agency, on behalf of the RAs responded to the SLFN concern and advised that CEAA does not require assessment of induced growth unless the type of projects, the area of impact and the environmental components that would be affected could reasonably be identified and are likely to interact with the Project. For water quality issues, the MoT has confirmed that while oil and grease will increase as a result of the Project, the increases will be well below standard guidelines for water quality for drinking water and aquatic life. Based on this additional information, EC and DFO accepted exclusion of oil and grease from the cumulative effects assessment.

In the West Vancouver Clarification Report, the MoT considered five ecosystem components (acid rock drainage/metal leachate, birds, air quality, stormwater/water quality, and loss of common vegetation) when assessing the potential for either Option B or Option D to result in cumulative environmental effects. The MoT's findings are that the conclusions in its original cumulative effects assessment report of February 2004 remain valid.

The Canadian Environmental Assessment Agency requested the MoT to consolidate the analysis of the potential cumulative environmental effects of Option B and Option D into an addendum to the original cumulative assessment. The MoT provided the addendum to the RAs on May 10, 2004.

Conclusion
DFO and have reviewed the cumulative effects assessment completed by the MoT, including the addendum. Based on this information and provided the MoT implements the actions described in the Owner's Commitments and Responsibilities - Sea-to-Sky Highway Improvement Project, the DFO and EC are satisfied that there will be no significant cumulative environmental effects from the Project.

17. SIGNIFICANCE OF RESIDUAL ENVIRONMENTAL EFFECTS

DFO, EC, TC and INAC, responsible authorities as defined in the *Canadian Environmental Assessment Act*, have completed their review of the environmental impacts involved in the proposed construction and operation of the Project and have considered the Application; Clarification Reports; government, and First Nation comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups.

All relevant factors required by Section 16 (1) of CEAA were considered including the environmental effects of the Project and their significance. DFO, EC, TC and INAC conclude that the project is not likely to cause significant adverse environmental effects.

18. ENVIRONMENTAL MANAGEMENT PLANNING

The EAO and federal RAs require a proponent to outline a proposed Environmental Management Plan (EMP) as part of the environmental assessment process. Volume 5, Section A of the Application sets out the measures that the MoT proposes as part of its environmental management strategy for Project construction and operation.

The MoT will develop a comprehensive EMP prior to the start of construction, in accordance with Section 165 of the Ministry's *Standard Specifications for Highway Construction*, to convey an understanding of the project's environmental constraints (including construction timing) and how the Project will be undertaken to avoid/mitigate negative impacts. The MoT will submit components of the EMP to government agencies and First Nations for review and comment or acceptance (where required). The EMP will include:

- Air Quality Monitoring and Mitigation Plan
- Archaeology Management Plan
- Raptor/Heron Management Plan
- Bear/Human Conflict Reduction Plan
- Construction Schedule pertaining to permits and approvals, environmental tasks, environmental timing windows and work restrictions
- Contaminated Soils Management Plan
- Environmental Quality Management Plan
- Environmentally Sensitive Areas Management and Protection Plan

- Environmental Training Plan
- Equipment and Materials Plan
- Fisheries Mitigation/Compensation Plan
- Infrastructure Demolition Management Plan
- Materials Management Plan
- Noise Control and Mitigation Plan
- Potentially Acid Generating/Metal Leaching Materials and Acid Rock Drainage Adaptive Management Plan
- Riparian Restoration and Terrestrial Reclamation/Revegetation Plan
- Sensitive Ecosystem Management Plan
- Sediment and Drainage Management Plan
- Soil Conservation/ Stripped Organic Material Plan
- Spill Contingency and Response Plan
- Stripped Organic Material Management Plan
- Tailed Frog Management Plan
- Vegetation Debris Management Plan
- Waste Management Plan
- Water Quality Sampling Program
- Wildlife Mitigation Plan.

Working Group Review of the Application
An expanded description of the written comments submitted by working group members on environmental management planning is presented in the Issue Tracking Table in Appendix 1A of this Assessment Report. Working group comments focused primarily on planning to manage PAG/ML materials, water quality and air quality. WLAP, EC, TWFN and MEM provided suggestions for the Water Quality Monitoring Program. WLAP also wishes to review the a Vegetative Debris Disposal and Monitoring Plan and the Air Quality Monitoring and Mitigation Action Plan before they are finalized and prior to the start of Project construction. The SLFN stressed that the plans should include information on mitigation techniques, environmental inspectors' roles and responsibilities and instructions to highway construction contractors to demonstrate how environmental protection measures will be applied during all phases of the Project (i.e. planning, construction, restoration and operation).

The MoT has committed to share copies of the EMP or relevant sections of the EMP with agencies and First Nations for review and comment, post-environmental assessment and prior to the start of construction.

19. FOLLOW-UP AND MONITORING

In the *Owner's Commitments and Responsibilities - Sea-to-Sky Highway Improvement Project* the MoT commits to develop an Environmental Management Plan prior to construction start-up, in accordance with or equivalent to the provisions of Section 165 of MoT's *Standard Specifications for Highway Construction*, to convey an understanding of the project's environmental constraints (including construction timing) and how the Project will be undertaken to avoid/mitigate negative impacts. As noted in Section 18 of this Assessment Report, the MoT will submit the component plans and/or the Environmental Management Plan to the appropriate environmental agencies for review and comment or, where required, for review and acceptance, before work commences. The MoT will require the Contractor to retain an environmental monitor to work on-site during all phases of highway construction. The monitor will work with the Contractor to ensure the protection of the environment, that mitigation measures are appropriately implemented and to facilitate communication between the Contractor, environmental agencies, and MoT. The MoT further commits to undertake environmental quality audits to ensure the Contractor complies with the Environmental Management Plan.

Conclusion
During this cooperative environmental assessment the EAO, DFO and EC have considered: the Application; Clarification Reports; government, First Nation and public comments on the potential effects of the Project; responses from the MoT; and the discussions of the Biophysical/Technical and Socio-Economic Working Groups. Based on this information and provided that the MoT implements the actions described in the *Owner's Commitments and Responsibilities: Sea-to-Sky Highway Improvement Project*, the EAO, DFO and EC are satisfied that plans and timeframes for Project and post-Project monitoring will be satisfactorily developed as part of the Environmental Management Plan, and implemented.

20. PERMITS, LICENCES AND AUTHORIZATIONS

This is provided only for information purposes and is not a comprehensive list of all permits, licenses or authorizations that may be required for the Project.

Provincial

Fish Protection Act
Forest Act
Heritage Conversation Act
Highway Act
Land Act
Water Act
Waste Management Act

Federal

Fisheries Act
Navigable Waters Protection Act
Canadian Environmental Protection Act
Indian Act

First Nations

Squamish Nation Archaeological Permit

SEA-TO-SKY HIGHWAY IMPROVEMENT PROJECT ASSESSMENT REPORT

APPENDIX 1A

BIOPHYSICAL/TECHNICAL ISSUES TRACKING

List of Acronyms used in Appendix 1A

BCR	BC Rail
BMP	Best Management Practices
CEAA	Canadian Environmental Assessment Act
CEA Agency	Canadian Environmental Assessment Agency
CSD	Context Sensitive Design
CWS	Canadian Wildlife Services
DFO	Fisheries and Oceans Canada
EC	Environment Canada
EAO	Environmental Assessment Office
GVRD	Greater Vancouver Regional District
MEM	Ministry of Energy and Mines
MoT	Ministry of Transportation (Nelson Region)
MSRM	Ministry of Sustainable Resource Management
OCR	Owner's Commitments and Responsibilities – Sea to Sky Highway Improvement Project (MoT)
RESL	Robertson Environmental Services Ltd.
SLFN	Squamish and Lil'wat First Nations
SLRD	Squamish-Lillooet Regional District
TWFN	Tsleil-Waututh First Nation
WLAP	Ministry of Water, Land and Air Protection

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
1. PROJECT DESIGN		
Discuss the safety justifications for the reduced lane widths and median width for an 80km/h, high traffic volume, mountainous highway with significant truck and bus traffic volumes. Provide examples of successful application of Context Sensitive Design (CSD) standards in other North American jurisdictions. (MoT)	SCD Guidelines have been successfully applied on highway projects in the 5 pilot American states of Connecticut, Maryland, Kentucky, Minnesota and Washington. For the Highway 99 corridor, a safety analysis has been performed. This analysis indicates a reduction of about a third of the number of accidents as a result of the $600 million pre-2010 program. The percentage of truck and bus traffic on this highway is less than 3% and is considered low.	Satisfactorily addressed for the purposes of the EA review
Slope stabilization measures (mesh, rock bolting, etc.) are not referenced in CSD criteria sheets but should be included in final design. (Ref: MoT Technical Bulletin GM02001). (MoT)	Technical Bulletin GM02001 was adopted as an aspect of CSD for the Sea to Sky corridor.	Satisfactorily addressed for the purposes of the EA review
Clarify reference to "improved passing opportunities" along Lions Bay to Furry Creek segment. Do the volumes of opposing traffic permit any use of passing opportunities, particularly during peak traffic periods when the passing pressures are the greatest? (MoT)	This section of the highway will remain as two lanes and work will generally be limited to alleviate condition at the more deficient locations. While the scope of work has not been detailed at this time, the intention is to increase the length or number of passing lanes where it is achievable.	No further detail required for the purposes of the EA review
The detailed design phase of this project should provide an access management strategy for the segment of highway from South Stawamus to Depot Road to help guide development adjacent to the highway. (MoT)	The current access strategy for this section of highway doesn't permit private access to the highway. All private businesses adjacent to the highway are currently accessed from municipal roads. This will be re-confirmed during the design process. The design of this section will commence in the very near future.	OCR - 8.1
What design criteria will be used for the ramps to and from the BCR line (minimum widths and maximum grades in particular)? (MoT)	The design criteria for the access ramps are based on road classification for Low Volume Roads. Total width for these single lane roads is 5.5m, including a 3.5m wide lane. Maximum grades allowable under this standard are 14%, however efforts were made to keep grades under 12%.	Satisfactorily addressed for the purposes of the EA review
Consider designing an intersection closer to 90° to the highway at Highway 99 and Valley Drive and Stawamus Forestry Road. Oblique angle intersections often have higher accident rates due to driver difficulty in checking for on-coming traffic. (MoT)	Design of intersections at as close to 90° as possible is always an objective, but not always achievable, particularly in the type of topography along the Highway 99. Valley Drive is currently signalized, but both of these intersections will be examined in more detail during detailed design.	Satisfactorily addressed for the purposes of the EA review
Has the proponent modeled the traffic patterns when BCR used as a single-lane-alternating detour and considered that slow moving trucks and that traffic cannot be stored in rockfall hazard zones? (MoT)	A traffic study was undertaken to identify the operational viability of this concept. The operation of the detours has limitations. The longer the length of the detour, the longer the traffic delay or the shorter the window of opportunity to operate the detour, given a maximum delay criteria. An average travel speed of 40 km per hour was used for the study. The presence of rockfall hazard areas was acknowledged in the study, but not modeled in detail since a significant program of slope stabilization will be undertaken prior to use of the corridor by vehicular traffic.	Satisfactorily addressed for the purposes of the EA review
Consider placement of tow trucks at key locations as an emergency operations procedure during the use of BCR as a detour. (MoT)	This has been considered and is included in the BCR Detour Concept Development Study. **EAO Note:** The MoT no longer plans to use the rail line as a detour during Project construction.	No longer applicable
Consider retaining the temporary industrial bridge spans for reuse by MoT during emergency situations upon completion of the project. (MoT)	The MoT District may be interested in maintaining temporary bridge spans for this use.	Information item only

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
1. PROJECT DESIGN		
Who will be responsible for maintenance of a highway segment being constructed – the highway construction contractor or the maintenance contractor? Will the BCR detours be included in this maintenance work? Often it is preferable that the maintenance responsibilities be transferred to the construction contractor. (MoT)	This will be dealt with consultatively with the MoT District during development of procurement documents. Responsibilities may change from contract to contract, depending on scope of work. If construction shuts down over the winter, arrangements can be coordinated between the project and District for maintenance during that time. Maintenance of BCR detours will be determined prior to the procurement process in consultation with the new operator.	Satisfactorily addressed for the purposes of the EA review
Bridges should be built to the 200 year Flood Construction Levels (DoS).	New Bridges required for the project will be designed to the 1 in 200 year flood levels (BTWG meeting – Dec 4, 2003)	Satisfactorily addressed for the purposes of the EA review
Introduce a green boulevard model in the Squamish section of the highway design to minimize habitat loss. (DoS)	**EAO Note:** Point of Information and matter for detailed design.	
2. GEOSCIENCES		
2.1 Metal Leaching and Acid Rock Drainage (ML/ARD)		
The possible need to stockpile surplus rock is mentioned on page 4, section 1.4. However, there is no outline of where these sites might be or if they were included in the EA. Would new sites be needed, requiring clearing and development, or would existing sites need expanding? (SLFN)	Identified stockpile sites are Westport Pit, Brunswick Pit and Callaghan Pit. All are existing Ministry gravel pit or aggregate processing and stockpile sites. The location of these pits is described in Vol. 1 Sec B page 29, and shown in the Volume 1 Map and Drawing Folio.	Satisfactorily addressed for the purposes of the EA review
In terms of Metal Leaching (ML) Potential, a statement is made on page 10, section 2.1 that "a more detailed risk assessment will be undertaken during detailed design in order to refine the nature and extent of the monitoring program." The monitoring program is offered as a mitigation measure. The First Nations consider this approach to be a deficiency in the EA. (SLFN)	The project will dispose of all PAG/ML materials either in designated ocean disposal sites at Watts Point and Point Grey or in the Britannia Mine. Monitoring will: • examine new rock cuts during construction to assure the Project that, should any zones presenting ARD/ML issues be exposed, appropriate measures would be taken; and • sample and test water quality in the vicinity of rock cuts known to present ARD/ML issues.	Satisfactorily addressed for the purposes of the EA review OCR 2.4-2.6, 2.9
The potential for neutral leaching of Al and Cu from new rock cut faces during a "first-flush" event cannot be fully discounted, specifically if sensitive biological receptors reside within or immediately downstream of roadside ditches; several sensitive streams have been identified. (MEM)	The MoT recognizes that the potential for neutral leaching of aluminum and copper from new rock cut faces during a "first flush" event cannot be fully discounted. A water quality sampling and analysis program will be undertaken by the MoT. Water sampling and analysis will be conducted where there are rock cuts in PAG or ML rock material. The sampling of water runoff will be conducted in sensitive streams and highway ditches.	Satisfactorily addressed for the purposes of the EA review OCR 2.6

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
2.1 Metal Leaching and Acid Rock Drainage (ML/ARD)		
Concentrations in ditches under rock faces or "first flush" events could place contamination in streams. Aluminum and copper leachate levels in ditches below rock cut faces in PA Sections 2 & 3 already exceed Canadian Toxicity standards.(TWFN)	The project will be disposing of all PAG materials either in designated ocean disposal sites at Watts Point and Point Grey or in the Britannia Mine. Monitoring will be undertaken to: examine new rock cuts during construction to ensure that, should any zones presenting ARD issues be exposed, appropriate measures are undertaken; and sample and undertake water quality testing in the vicinity of rock cuts known to present ARD issues. MoT is committed to the management of project related water quality issues within the STS corridor. In that regard, the MoT has been engaged in extensive discussions with the MEM and EC in relation to the monitoring of PAG materials.	Satisfactorily addressed for the purposes of the EA review OCR 2.1, 2.4, 2.6, 2.9
Request a long-term PAG monitoring program along the relevant length of the project right-of-way and mitigation plans. (TWFN)	See above response. Also, a monitoring program is being completed to meet the MEM's requirements and to satisfy the related issues raised by EC.	Satisfactorily addressed for the purposes of the EA review OCR 1.2, 2.13, 2.14
PAG rock cut surfaces have the potential to leach significant metals at some point in the future. Where avoidance measures cannot be fully utilized, additional mitigative measures (such as drainage management) should be considered. Plans should include the monitoring and maintenance provisions for the mitigation of PAG rock cut surfaces. (MEM)	The MoT will retain a qualified consultant to monitor potential for acid generation and metals content through construction and recommend specific mitigative strategies to best address conditions as encountered.	Satisfactorily addressed for the purposes of the EA review OCR 2.9, 2.13
For the Gambier Group, if there is uncertainty regarding the PAG nature of the materials or the ability to segregate PAG from non-PAG materials during construction, MoT should apply PAG rock disposal strategies to all this rock. (MEM)	Studies are underway to determine the engineering properties of rock in proposed excavations along the length of the Sea to Sky corridor and the suitability for use in a variety of aggregate products. **EAO Note:** Studies now completed and results reviewed by MEM.	Satisfactorily addressed for the purposes of the EA review
Howe Sound is a sensitive aquatic feature and does not appear to have been included in this section. The construction and operation of the project could adversely impact water quality. The impacts to Howe Sound should also be assessed. (DFO)	Application Volume 1 Appendix 1D3 "Environmental Assessment of ARD/ML Effects from Bedrock Excavation, Reuse and Disposal" presents the results of the assessment of impact of metals leaching on the water quality of Howe Sound. MoT is committed to implementing measures to mitigate any effects on water quality associated with run-off from PAG/ML rock cuts and to monitor surface waters. EC believes the MoT predications appear thorough and conservative, plans for handling such units are feasible, and does not expect elevated metals concentrations in drainage from rock cuts to cause risks to the adjacent aquatic environment.	Satisfactorily addressed for the purposes of the EA review OCR 2.6

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
2.1 Metal Leaching and Acid Rock Drainage (ML/ARD)		
If segregation of Gambier PAG and non-PAG lithologies is planned, methods to operationally achieve this required. (MEM)	The MoT will be disposing of all PAG materials.	Satisfactorily addressed for the purposes of the EA review OCR 2.11, 2.12
If PAG materials are going to be used for asphalt applications the potential for ML/ARD from remaining exposed surfaces and over the longer-term still needs to be addressed by MoT. (MEM)	PAG materials are not being considered for use as asphalt aggregate.	Satisfactorily addressed for the purposes of the EA review OCR 2.11
MoT plans for Marine Disposal and Disposal at Britannia Minesite are tentative at this point and the ability to mitigate significant environmental effects from the excavated PAG materials hinges on access to these mitigation strategies. Additional written information should be provided to demonstrate that disposal options are viable (i.e. approval in principle with appropriate agencies, information requirements, restrictions) (MEM)	The letter dated October 21, 2003 to Linda Sullivan (CEAA) from Environment Canada (EC) noted that, with respect to metal leachate/acid rock drainage (ML/ARD), the MoT's "predictions are thorough and conservative and their plans for handling such units are feasible ". EC is the federal authority that regulates ocean disposal. The MoT has initiated a study of the feasibility and cost of using a conveyor system to move surplus rock to a proposed barge-loading site at Sunset Marina. This facility could be used for movement of PAG materials for barge disposal at Watts Point or Point Grey. The MoT has commenced discussions with respect to using the Britannia Mine for the disposal of PAG/ML rock, with specific thought to disposal of 7,000 m^3 from the zone of alteration south of Lonetree Creek.	Satisfactorily addressed for the purposes of the EA review MoT will use Britannia Site for PAG/ML rock disposal OCR 2.11, 2.15, 2.16
Environmental effects from ML/ARD could potentially be associated with initial handling, stockpiling of excavated materials, transportation of these materials and their use for bulk fill, shoreline fill, concrete, asphalt, granular road base or construction aggregates. Strategies required to mitigate water quality effects from re-use of non-PAG should include water management structures that consist of upstream diversion and downstream collection and appropriately sized settling ponds. (MEM)	If it is determined through this testing that these materials are PAG/ML, mitigative strategies will be developed. The MoT will continue ongoing liaison with the MEM as the testing proceeds.	Satisfactorily addressed for the purposes of the EA review OCR 2.3
Provide further assessment of greenstones near Daisy Lake. (MEM).	The MoT has requested further testing of the Greenstones. **EAO Note:** Testing Completed and Results Reviewed by MEM.	Satisfactorily Addressed OCR 2.1
Clarify plans for acid generating material at Lone Tree (is material suitable for marine disposal?) (MEM)	Enhanced static testing of the Gambier Group within Sections 2 and 3 has been completed. Results of kinetic tests will be available in February 2004. This program has identified four rock cuts within preliminary design sections 2 and 3 that have been characterized as potentially acid generating (PAG). The total volume of rock excavation based on preliminary design is 40,000 m^3 of which 7,000 m^3 is within the very distinct zone of alteration south of Lonetree Creek.	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
2.1 Metal Leaching and Acid Rock Drainage (ML/ARD)		
Encapsulation has a long-term liability component and would require an engineered design as well as long-term monitoring and maintenance commitments to ensure effectiveness. (MEM)	If it is determined through testing that these materials are PAG/ML, mitigative strategies will be developed. The MoT will continue ongoing liaison with the Ministry of Energy and Mines (MEM) as testing proceeds.	Satisfactorily addressed for the purposes of the EA review OCR 2.17, 2.18
A slope stability assessment prepared on the basis of a Terrain Classification System mapping and assessment is required. (SLFN)	Terrain Classification System mapping may be suitable for general planning level studies but not for engineering risk assessment of rock slopes. All rock slopes along Highway 99 have been assessed and hazard prioritized by MoT and its engineering consultants using the Rockfall Hazard Rating System (FHWA OR-EG-90-01). On new rock cuts, engineering assessment is undertaken during construction by the geotechnical design engineer of record, and suitable stabilization measures applied as required. On existing rock slopes that will not be re-constructed, a consultant contract is being prepared for conducting a detailed engineering assessment and design of stabilization measures. Rock slope stabilization contracts will then be awarded to implement mitigation measures.	Satisfactorily addressed for the purposes of the EA review
2.2 Hazards		
Clarification is needed of the MoT's proposal to optimize "preliminary highway alignments to minimize rock excavation in areas where the potential exists for acid generating material" (page 2). Does this mean the highway could be relocated into areas requiring further assessment? (SLFN)	This statement refers to alignment adjustments within the existing highway corridor, generally from one side of the existing highway to the other side, for example, to avoid having to excavate into a high rock face or to avoid an environmentally sensitive area. It generally would not include significant shifts off the proposed alignment. The MoT has sufficient knowledge of corridor geology to determine impacts of such a shift.	Satisfactorily addressed for the purposes of the EA review
Section 5.3, page 42, presents a discussion of design requirements for structures related to earthquake activity. However, there is no mention of design details for fill slopes or engineered slopes. (SLFN)	Design requirements are presently being reviewed by MoT. Design will likely be based on a requirement that following a design earthquake, the highway will be useable by emergency vehicles and following maintenance, by the public.	Satisfactorily addressed for the purposes of the EA review
The submitted preliminary design drawings do not show any details of the proposed barrier walls at either the Disbrow, Sclufield or Kallahne creeks (Unnamed #1, #7 and #8 creeks could not be located on the design drawings. (MoT)	Kallahne, # 7 and #8 creeks are within Section 3, outside the project scope for the current phase of reconstruction of Highway 99. These creeks will be assessed when design for upgrading of Highway 99 to four lanes through this section is undertaken. Unnamed #1 is immediately south of Sclufield Creek and probability of occurrence of a debris flow is indicated as high in the Klohn Leonoff report, although there is no recorded history of an event. However, the design volume is low (6000m3) in comparison to creeks such as Harvey, Magnesia & Charles. No inexpensive mitigation option to improve catchment for Unnamed #1 – ($350,000 to $1.8 m.)	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
2.2 Hazards		
MoT states that higher frequency debris torrent sites are located in the Hope area where "no mitigative measures" have been constructed. Mitigative measures include deflection berms and construction of chutes below bridges – a number of which have been constructed in the Hope area. (MoT)	There are mitigative measures –including deflection berms and chutes below bridges– near Hope. The intended reference was to the Patterson Creek area of Highway 1.	Satisfactorily addressed for the purposes of the EA review
Review sites identified by the 1983 Thurber report on a site by site basis for risk and decide mitigative measures based on the assessed risk. Low frequency debris torrent site may pose more risk for loss of life if there is a high density of residents located in the depositional area of the torrent. (MoT)	Further assessment was undertaken by Klohn Leonoff and presented in their 1991 report. Decisions for the current project were based on both the Thurber and Klohn Leonoff studies with additional assessment undertaken for the proponent on Disbrow Creek.	Satisfactorily addressed for the purposes of the EA review
Monitor debris torrent structure at Newman Creek to asses the long-term environmental effects of this and similar structures along the project route. (TWFN)	There are no plans to conduct any work at Newman Creek as part of the STS project. The debris flow mitigation structure at Newman Creek was constructed in the late 1980's, largely for the protection of local residential areas.	Satisfactorily addressed for the purposes of the EA review
The discussion of the effects of the environment on Highway 99 should include discussion or listing of the very large rockfall events that have occurred along the corridor (i.e. events greater than 5000 m3) similar to data presented for debris torrents. (MoT)	The Application did not discuss the very large rockfall events that have occurred along the corridor (i.e. events greater than 5000 m^3). The MoT agrees that the proposed highway improvements do not address these rockfall events that are difficult to predict let alone remediate.	Satisfactorily addressed for the purposes of the EA review
Britannia Creek Flood Risk Assessment by Golder Associates estimated the 200 year flood would inundate the highway and railway with debris deposited on Hwy 99 over a distance of about 400 m. This risk will not be reduced until Britannia Creek sediment is removed, or the stream channel is dyked and the Application does not include means to address this problem. (EC)	A flood mitigation study is underway for Britannia town site under direction of the SLRD with an independent consultant. The MoT will have access to the results of this study. On behalf of MoT, Intercad has undertaken an analysis of the Britannia Creek Bridge in their preliminary design report and commented on the hydraulic capacity of the existing structure and the proposed temporary up-stream bridge.	Satisfactorily addressed for the purposes of the EA review
Discuss the effects of logging the slopes above the highway creating new avalanche hazard zones and the review and permitting process in place by MoF. (MoT)	MoF requires avalanche hazard assessments on steep slopes on Crown land above the highway. Avalanche hazard assessments are not required on private land. There is no moratorium on logging above the highway. To the best of our knowledge, this situation exists throughout the province and it is outside the scope this Project.	Satisfactorily addressed for the purposes of the EA review
Discuss the hazard posed by the Cheekye River. Various papers by geotechnical and geologic experts have been written on the hazards of very large debris flows associated with the Cheekye River and associated fan. (MoT)	Cheekye River Bridge is not within the scope of the Project.	No further detail required for the purposes of the EA review
Recommend full review of the disaster management plan for the Garibaldi Civil Defense Zone (GCDZ) be carried out. . (TWFN)	The Rubble Creek Landslide Hazard Area (RCLHA – formerly the GCDZ) was created by Order in Council 1185 in 1980 and has been subject to several technical reviews since that time. Before reaching a decision on the preferred option, a Multiple Account Evaluation (MAE) comparative assessment was carried out on comparing options, considering capital costs, maintenance costs, highway user benefits, socio-community benefits, risks to highway users and environmental impacts. The results of the MAE supported he construction of improvements to this section of highway on the existing alignment, rather than relocate the highway outside of the RCLHA..	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
2.2 Hazards		
Recommend a risk assessment be carried out similar to that undertaken for the Garibaldi Civil Defense Zone. . (MoT)	**EAO Note**: The MoT followed-up with the MoT representative on the working group after the BTWG and provided information already collected from previous studies. 04-12-03.	No further detail required for the purposes of the EA review
2.3 Contaminated Sites		
Section 4.3.2 contains limited information on vehicular accidents that resulted in significant spills. The provincial or federal spill reporting databases may provide further detail in this regard. (EC)	When preparing the Application, MoT consulted these records and did not find any information relevant to the Project.	No further detail required for the purposes of the EA review
The acceptability of placing clean fill over the existing soils at Britannia should be confirmed with WLAP well in advance of construction. Furthermore, a site specific plan for the area affected should be developed to ensure that future remediation efforts are not compromised. This may include an evaluation of the risks posed by construction over the existing contaminated soils. (EC)	The MoT met with MSRM staff and discussed the project plans through this area. The mitigation and remediation plan for the Britannia Beach site has yet to be finalized, however, MSRM indicated the highway improvements will not interfere with remediation efforts, the proposed water treatment plant, mine drainage control or the offshore effluent disposal projects. The MoT will request a letter from MSRM to this effect. In addition, the MoT has scheduled a meeting with the Britannia Mine Remediation Project to discuss remediation adjacent to the existing highway. Construction of the highway over any potentially, acid-drainage producing soils will improve the current situation by creating an anaerobic state with a sealed surface; the highway removes oxygen and surface seepage water which significantly reduces the potential for acid drainage or metal leaching processes to occur.	Satisfactorily addressed for the purposes of the EA review OCR 3.1-3.3
A site specific management plan for hydrocarbon contaminated soils uncovered during construction at Gonzales Creek Hydrocarbon Spill this site should be prepared and include mitigation methods for the containment and collection of any liquid phase hydrocarbons. (EC)	Should highway construction proceed within the area affected by this contaminated site, then coordination will occur between the design team (final design) and Levelton Engineering Ltd., who are managing the site for Scamp Industries and Hemmera Environmental, who are managing the site for Interfor (owners of the property on which the spill occurred) to ensure that remediation is done prior to construction.	Satisfactorily addressed for the purposes of the EA review OCR 3.4
A general plan should be prepared for the testing and management of suspect soils uncovered during construction. (EC)	The MoT has a plan for dealing with contaminated sites found during construction. Guidelines for this process are provided in the document entitled ‘Contaminated Sites – General Investigation Guidelines – 1998,” produced by the Ministry of Transportation.	Satisfactorily addressed for the purposes of the EA review OCR 1.2, 3.6
Provincial Emergency Program and Environment Canada Records on accidents resulting in spills should be consulted. (DFO)	When preparing the Application, MoT consulted these records and did not find any information relevant to the Project.	No further detail required

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
3 WATER QUALITY		
Request MoT to avoid marine disposal of waste rock. (TWFN)	Two designated ocean disposal sites administered by EC, have been identified. Disposal of waste rock at these sites will fully comply with the EC permitting requirements.	Satisfactorily addressed OCR 2.15
MoT received WLAP's Region 2 Revised Instream Works Best Management Practices CD. MOT is required to implement those BMP's throughout the lengthy construction of this Hwy upgrade. (WLAP)	Guidelines and standards applied will include the Land Development Guidelines for the Protection of Aquatic Habitat, Interim Standards and Best Management Practices for Instream Works, Section 165 of the Standard Specifications for Highway Construction and any updated best management practices developed during the course of this project including WLAP's Region 2 Revised Instream Works Best Management Practices.	Satisfactorily addressed for the purposes of the EA review OCR 5.7
Vehicle generated pollutants accumulated on the road surface will be washed into the receiving environment, primarily during first flush. Without adequate treatment prior to discharge into the receiving environment, ongoing polluted stormwater run-off will remain a residual effect. (WLAP)	It is important to bear in mind that this change will not cause runoff water quality to exceed applicable criteria. A discussion of water quality impacts will be included in the cumulative effects assessment that is being prepared.	Satisfactorily addressed for the purposes of the EA review
If any runoff is directed towards municipal drainage systems the provincial storm water effluent quality standards should be met at the entry point. (DoS)	**EAO Note**: Permitting Issue	No further detail required for the purposes of the EA review
Recommend extension of Rainline north of Darrel Bay on the Sea-to-Sky and the use of magnesium chloride de-icing agent. (Electoral Area D)	The MoT cannot force maintenance contractors to use anti-icers. In contract documents the MoT specifies that contractors should use environmentally friendly processes. The trend among contractors is to use magnesium chloride because it is more economical. (BTWG Meeting 04-12-03)	No further detail required for the purposes of the EA review
The water supply for Pinecrest Estates is Retta Lake, situated immediately beside the highway on the west side. Protection of this water supply is of paramount importance when considering plans for highway improvements. (Electoral Area D)	The MoT Project Team is committed to ongoing consultation with the community post-certification to address their concerns about safety and water quality.	Satisfactorily addressed for the purposes of the EA review OCR 10.7, 10.8, 17.1
For Section 2.2 - Clarify whether phase 3 of the water quality monitoring program starts before phase 2, or whether phase 2 monitoring is intended to occur in the 90 days *preceding* the start of construction for a given section. (EC)	More detail provided in *Water Quality Monitoring Program Sea-to-Sky Highway Improvement Project* attachment to the MoT response of November 26, 2003.	Satisfactorily addressed for the purposes of the EA review OCR 10.1
Each construction section should be regularly monitored through preconstruction, construction and post-construction. For example during construction, water quality should be monitored weekly for oil and grease, TSS or turbidity, pH and conductivity. (EC).	More detail provided in *Water Quality Monitoring Program Sea-to-Sky Highway Improvement Project* attachment to the MoT response of November 26, 2003.	Satisfactorily addressed for the purposes of the EA review OCR 10.1

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
3. WATER QUALITY		
Consider monitoring discharge points downstream of the construction area in certain cases. (EC)	More detail provided in *Water Quality Monitoring Program Sea-to-Sky Highway Improvement Project* attachment to the MoT response of November 26, 2003.	Satisfactorily addressed for the purposes of the EA review OCR 10.1
Why are physical or biological and oil and grease and related monitoring parameter s not listed in the monitoring program and where will they be included ? (EC)	See Water Quality Monitoring ProgramSea-to-Sky Highway Improvement Project (November 26, 2003) for more detail. Oil and grease were not included as monitoring parameters because they are not considered to be an issue normally associated with highway construction or operation of a highway with the level of traffic found on the Sea-to-Sky Highway. (BTWG – 04-1203 - The MoT agreed to include oil and grease in the pattern of testing for phases 2, 3 and 4.)	Satisfactorily addressed for the purposes of the EA review OCR 10.1
Section 3 - This section is comprised of brief summaries of water quality impact sources (siltation, coliform increases, changes in flow, hydrocarbon spills, blasting, and new pavement) covering two pages. The report does not present the spatial extent, magnitude, or significance of potential water quality impacts. Without these sections, the First Nations consider the water quality section of the EA incomplete.(SLFN)	The spatial extent is defined as the area immediately upstream of construction and all areas downstream. The magnitude of potential impacts is discussed in terms of applicable water quality criteria. The objective of the project is to ensure that water quality criteria are not exceeded as a result of construction and operation of the project. The project is committed to a thorough water quality monitoring program by which to measure achievement of this objective.	Satisfactorily addressed for the purposes of the EA review OCR 10.1
The EA notes that over the length of the project, the amount of winter de-icers used will increase by 42% and abrasives by 31%. All of this increase will occur where additional lanes or lane widths or added. Despite this increase, the report concludes that dilution of the chemicals by heavy runoff will eliminate any impact on the aquatic environment. (SLFN)	**EAO Note:** The Working Group is satisfied with the MoT's proposed water quality monitoring program.	Satisfactorily addressed for the purposes of the EA review
The water quality report fails to examine the increased metals and hydrocarbons generated by increased traffic volumes on water quality. `First flush˜ effects of runoff on water quality are not discussed. No maps show the location and kinds of water resources and effects that could be expected. (SLFN)	At the time of Application submission, MoT forecasted that traffic volumes could be about 7.5% percent higher with the improved highway compared to the status quo. Since submission of the Application, a Transportation Demand Management study for inter-city travel in the Sea to Sky corridor (Sea to Sky TDM Study by TSi Consultants) indicates that coordinated implementation of TDM and supporting supply measures could offset a portion or all traffic volume increases related to the project. The water quality samples taken in 2002 were during the first freshet after an extended dry period. The MoT recognizes that sampling of first flush events capture the highest concentrations of runoff contaminants. The MoT is committed to a thorough water quality monitoring program that will include continued sampling of first flush events. Terrain maps and plans show all stream crossings and ponds/lakes along the proposed corridor and Volume 3 Section D Appendix C provides information on exactly where water quality sampling was conducted.	Satisfactorily addressed for the purposes of the EA review OCR 10.1, 10.11

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
3. WATER QUALITY		
Increased road salt and sediments are identified as potentially reaching Murrin Lake. The report concludes that mitigation would include non-draining barriers to direct runoff away from the lake (although the report fails to identify where this water would go). Neither the significance of this impact nor any residual impacts are identified. (SLFN)	Volume 1 – Map and Drawing Folio includes drawing no. 41DD-PD06-9307 and 9307A which illustrates how highway runoff will be collected and piped away from Browning Lake and shows the placement of non-draining roadside barrier. No adverse effects are identified because the drainage solution will provide permanent protection to Browning Lake water quality. This is an improvement over the existing conditions.	Satisfactorily addressed for the purposes of the EA review
Water quality sampling program section is vague with regard to what action would be taken if problems are detected during the sampling program. (SLFN)	The objective of the project is to ensure that water quality criteria are not exceeded as a result of construction and operation of the project. The project is committed to a thorough water quality monitoring program by which to measure achievement of this objective.	Satisfactorily addressed for the purposes of the EA review OCR 10.1-10.15
Drainage systems should be designed to prevent increased flows from creating erosion problems downstream. (EC)	The "Manual of Control of Erosion and Shallow Slope Movement – 1997" is used as a reference for drainage design. Grass filter strips, biofiltration swales, lined channels, check dams, etc. are examples of control measures incorporated into highway drainage designs to slow flows and prevent erosion problems.	Satisfactorily addressed for the purposes of the EA review OCR 10.10, 10.12, 10.13, 10.15
The project relies on the biofiltration capacity of the proposed swales to reduce impacts to receiving streams. What maintenance is planned in terms of removing accumulated sediment and vegetation that may have reached its uptake capacity? How much of the highway alignment is expected to have space for swales or treatment ponds? (EC)	Ditches are inspected regularly by Ministry Area Managers and the privatized maintenance contractor and an annual ditching plan must be supplied by the contractor each year. All new ditch designs will incorporate swales, check dams, drop structures, lined channels, etc. Approximately 40% of the total highway ditch system will be improved to the new standards. Limited space for treatment ponds is available, so these will only be employed where warranted. Uptake capacity of vegetation is not an issue given the traffic volumes on the Sea-to-Sky Highway. Highway best management practices are designed to enhance the removal of solids and any associated sorbed pollutants through adsorption, filtration and settlement.	Satisfactorily addressed for the purposes of the EA review
Explain how water quality would be improved from the current situation and differentiate between zero impacts and water quality impacts that occur, but are still within environmental standards or guidelines. When standards or guidelines differ, the more conservative value should be used. (EC)	A reduction in suspended solids reaching streams will occur as a result of new ditch designs.. Water quality sampling on the STS Highway demonstrated that any current exceedances of the BC Water Quality Guidelines criteria for aquatic water standards are a reflection of the mineralogy of the rocks and not a product of highway run-off. MoT forecasted that traffic volumes could be about 7.5% percent higher with the improved highway compared to the status quo. It is reasonable to conclude that there will be environmental benefits as a result of the replacement of old infrastructure with new best practices.	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
3. WATER QUALITY		
Section 7.0 of the EA Application describes a three phase water quality sampling program which does not match the four phase program discussed in Section 2.2. Clarify which is proposed. (EC).	More detail provided in *Water Quality Monitoring ProgramSea-to-Sky Highway Improvement Project* attachment to the MoT response of November 26, 2003.	Satisfactorily addressed for the purposes of the EA review
Highway maintenance is part of the overall project impact and should be included in the water quality assessment. (EC)	More detail provided in *Water Quality Monitoring Program Sea-to-Sky Highway Improvement Project* attachment to the MoT response of November 26, 2003.	Satisfactorily addressed for the purposes of the EA review OCR 10.13
4. AIR QUALITY		
Pg 41, Figure 4-5 – Values for presented levels depend on what temperature and other conversion factors are used to convert ppb to micrograms per cubic metre. Some reference to the conversion factors could be added to highlight this fact. (WLAP)	Standard was derived using a reference temperature of 20 degrees Celsius to be applied to the 4th highest measurement annually, averaged over three consecutive years. It is understood in the air quality assessment that this is the basis for which the Canada Wide Standards (CWS) should be converted.	Satisfactorily addressed for the purposes of the EA review
Pg 46, Section 4.2, Summary of Air Quality - Mention how often Whistler and Squamish exceed the maximum *desirable* ozone objectives. (100 g/m^3) is the value that the RMOW uses as a reference. The CWS statement is incorrect. The CWS is designed to be an attainment standard, not a management standard and cannot be exceeded for certain periods of the year. O_3 levels in Squamish were close to the CWS for the 97-99 period. (WLAP)	It is unclear which statement is being referred to regarding the CWS in Volume 2, Section C, pg. 46, Section 4.2. However, since the CWS is based on a 3 year average, 98th percentile, it is understood that a measurement can be above 130 g/m^3 without being above at the 98th percentile at the end of the measurement period. It is noted that the O_3 levels in Squamish were 1 to 3 g/m^3 below the CWS for the 97-99 period (depending on the conversion technique used from ppb (see response to previous question).	Satisfactorily addressed for the purposes of the EA review
Pg 7, Section 2.3.3 Ammonia (NH_3) - The role of ammonia in the formation of secondary particulates is not discussed. This may be important to lay the foundation for comments provided in Section 5.5. (WLAP)	It is recognized that ammonia plays a role in the formation of secondary particulate, as stated in Volume 2, Section C, Section 2.3.2 of the Application. NO_2 causes a brown colour in the atmosphere at elevated concentrations and reacts in the atmosphere with ammonia to form fine particulate salts, which reduce visibility and increase $PM_{2.5}$ concentrations.	Satisfactorily addressed for the purposes of the EA review
Gather baseline information on air quality and permanently monitor impacts to air quality. TDM measures are critical for mitigating impact of increased traffic volumes. (DoS)	MoT OCR 6.4	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
4. AIR QUALITY		
Whistler is concerned about the degradation of air quality, and consequently public health and the resort experience of the Whistler Valley. The recent Community and Energy Plan, which includes an air quality management plan indicates that 48% of the total GHG emissions produced in the Whistler Valley are directly attributed to passenger vehicle transportation. (RMOW)	**EAO Note**: The MoT air quality expert subsequently met with the RMOW to explain how the air quality monitoring program was conducted.	Satisfactorily addressed for the purposes of the EA review
The report concludes that particulate pollutants emitted during construction would reach 92% of British Columbia air quality objectives. If the contribution of road dust from onroad vehicles is added, 24-hour PM_{10} concentrations could exceed the guideline. The report concludes, “therefore, it is important that pollution prevention and control measures are used to minimize potential dust or emissions of particulate matter” (page 86). (SLFN)	In consideration of a level of contribution from onroad vehicles, and in consideration that the Maximum predicted 24-hour concentration of PM_{10} is 92% of the objective, some mitigation and pollution prevention controls were deemed to be warranted. These measures were outlined in Vol 2, Sec C, Section 10 page 91.	Satisfactorily addressed for the purposes of the EA review OCR 6.1
The model results represent ambient air quality conditions (the air quality effects over a relatively large area). Could localized air quality effects (near to the right-of-way) exceed ambient emission level - e.g asphalt batch plants, or dust-generating activities (clearing, grubbing, grading, hauling)? (SLFN)	In general, the model results presented in the report, represent the maximum predicted worst-case impact for the applicable averaging period for each pollutant. The CALINE model was applied every 100m from Horseshoe Bay to Function Junction along the highway at distances ranging of 1m from roadside out to 1000m from roadside (page 22). Only the worst-case predictions were presented,. The model results (conservatively) represent “localized air quality effects” near the road itself. This is also illustrated in Vol 2, Sec C, Figures 8-2 through 8-10. The maximum predicted concentration occurs immediately next to the roadway (1m) at one location in the airshed (all other concentrations are predicted to be lower). No residences are situated at this location. For potential of a health effect to occur, a person would need to be alongside the road, for 24-hours at the exact same day that the worst-case concentration occurs.	Satisfactorily addressed for the purposes of the EA review
It is unclear how the authors conclude that automobile emissions from the operation of the highway could be considered a medium term impact. (SLFN)	The conclusions are based on the definitions that are used (page 87). The short-term is defined as extending one day or longer, but less than one year, and medium-term is defined as extending through the life of the project (i.e. through to 2025).	Satisfactorily addressed for the purposes of the EA review
The report authors conclude that the improved highway will have a “neutral to low impact” on air quality compared to the no-project alternative. This conclusion is not consistent with the tabular results contained in the air quality section. In these tables, moderate increases in emissions are noted for all pollutants, reflecting the increased traffic volumes anticipated to accompany the highway upgrade. (SLFN)	An additional statement is provided here for clarification: In follow up to the statement on page 91, mitigation and management measures were recommended (Vol 2, Sec C, Section 10) to arrive at a “low impact” rating. It is noted that with respect to the highway improvements when compared to the status quo, that a rating of “Low” is appropriate. It should be noted that air quality of criteria air contaminants (except ammonia) is expected to improve through 2025 with respect to the baseline.	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
4. AIR QUALITY		
The report emphasizes, however, that the per vehicle emissions will decline substantially due to improvements in fuels and vehicle equipment over the study period. The report does not discuss how air quality would be affected if these assumed improvements in fuels and vehicles fail to occur. (SLFN)	The improvements as a result of fuels reformulations and vehicle control technologies are not "assumed" improvements. Only improvements that are already in place under legislation/regulation are considered in the modelling. As the vehicle fleet turns over in the future years, improvements will also result from use of new vehicle technologies.	Satisfactorily addressed for the purposes of the EA review
Pg 51, Section 5.3 – It would help to have a summary table to understand the relative magnitude of the construction emissions - a worst case and average case scenario (depending on how often equipment is used and construction activities occur) would help quantify the annual total. (WLAP)	Volume 2, Section C, Tables 5-7 and 5-8, pg. 52 and 53, show the total tonnes per year of fugitive dust and equipment as a result of the STS construction activities.	Satisfactorily addressed for the purposes of the EA review
Mitigation options need to be explored given the predicted increase in greenhouse gas emissions by 2025. MoT should provide a range and combination of TDM options for this highway that reduce the levels of greenhouse gases emitted as well as the amount of PM_{10} (and to a lesser extent, ammonia). (WLAP)	The MoT recognizes the importance of TDM along the STS corridor and is facilitating a TDM study for the corridor with the ultimate goal of improving the corridor's air quality and extending the life of the planned highway improvements. The MoT anticipates that the TDM options identified will act to reduce the number of annual average daily trips on the highway and as a result, the projected impacts of air quality and GHGs would be reduced from the original assessment in the Application. The extent to which measures are effective will rely on the number of vehicles and the length a reduced trip. However, both of these measures would result in an air quality/GHG improvement.	Satisfactorily addressed for the purposes of the EA review
Further studies are required to assess air quality throughout the Howe Sound Airshed. VOCs and ammonia readings have not been taken anywhere in the airshed. (TWFN)	The air quality impact assessment addressed impacts to ambient air quality (Application V.2, Sec C); existing emission sources are characterized in Vol 2, Sec C, Sec 5.1; ambient air quality monitoring locations for a variety of pollutants was used to characterize the current air quality in the air shed (Vol 2, Sec C, Sec 4). The 98 percentile concentration from monitors was added to the maximum predicted modeled contribution from the highway. This represents a conservative approach to assessing contributions to cumulative air quality. Even when the ambient concentrations were added to the predicted emissions form the highway for the baseline and in future years (see Vol C, Sec C, Section 8.1, Table 8-1), the resulting concentrations remained below the applicable air quality objectives. No proposed or publicly disclosed future projects that require EAO approvals were discovered that are associated with direct emissions to atmosphere that could cumulate with the Project impacts. The associated traffic increase was included in the forecasts scenarios for 2010 and 2025, thus the potential impacts from foreseeable future projects were considered within the air quality assessment.	Satisfactorily addressed for the purposes of the EA review
Design a detailed ozone abatement program for Whistler area and implement this as a component of the highway project. (TWFN)	It is not anticipated that emissions from point and area sources within the airshed along the corridor will change significantly in the future years. Given that the ratio of NO_X to VOC emissions is also not expected to change, the emission decrease from vehicles would result in a slight reduction of ozone in the airshed.	Satisfactorily addressed for the purposes of the EA review
Assess the impacts of an expanded Sea to Sky Highway on metro Vancouver air quality. (TWFN)	This change is negligible when compared to the overall emissions in the Lower Fraser Valley, and other trans-boundary influences in the GVRD.	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
4. AIR QUALITY		
Provide information on mitigation options to reduce increases in greenhouse gas emissions. Consider the relative benefits of TDM measures from an emissions (either GHG or CAC) standpoint. (WLAP)	There are no air quality objectives for greenhouse gases, as it is not a directly comparable issue to the health issues surrounding Criteria Air Contaminants (CACs).	Satisfactorily addressed for the purposes of the EA review
Recommend an Air Quality Monitoring and Mitigation plan to outline under what conditions monitoring should take place and what mitigative actions will take place should any ambient concentration thresholds be reached (e.g. if the rolling 24-hour PM_{10} concentration exceeds 50 g/m^3, residents are warned and additional dust control measures will be put in place, burning activity or blasting activity will cease, etc.). (WLAP)	The MoT has committed to monitoring PM_{10} and $PM_{2.5}$. These commitments to monitoring and mitigation will be captured in the Environmental Management Plan by the MoT.	Satisfactorily addressed for the purposes of the EA review OCR 1.2, 6.1, 6.2
Provide a range and combination of TDM options that reduce levels of greenhouse gases emitted as well as the amount of PM_{10} (and to a lesser extent, ammonia). Consult with municipalities and other interested stakeholders to determine the most effective (from an economic and emissions reduction standpoint) and appropriate TDM strategies for this highway. (WLAP)	The MoT will look for an opportunity to bring the TDM issues to a larger forum such as the Howe Sound Community Forum. The MoT is not responsible to lead any future initiative but recognizes it has a role in future TDM initiatives and would participate in discussions when a larger inter-jurisdictional forum is organized. (SEWG – 12/02/04)	Satisfactorily addressed for the purposes of the EA review
If burning of land clearing debris is determined as the only viable solution for certain portions of the corridor, continuous PM monitoring should occur at nearby residences during the burn, and a response plan should be put in place if a concentration threshold is reached. Threshold response plan could be determined as part of an Air Quality Monitoring and Mitigation Action Plan. (WLAP)	At this time, no burning is planned near residences; however the MoT would take into account air quality management considerations should there be any vegetative disposal that could impact nearby residences. The MoT recognises that monitoring should take place on days where ambient levels could already be elevated.	Satisfactorily addressed for the purposes of the EA review OCR 6.3
Pg 19, Section 2.4.3.9, first paragraph – This paragraph states that there is a high level of uncertainty for quantifying the level of emission rates for short periods during construction activity. In other words, the construction activity peaks may not be captured by the modelling. (WLAP)	The modeling incorporates the annual emissions at the highest expected level of emissions (2007), and therefore captures a reasonable level of conservatism. The assumption that all equipment is operating in a 1km section of road (pg. 51) also adds conservatism to the assessment to capture peak concentrations.	Satisfactorily addressed for the purposes of the EA review
Pg 54, Section 5.5, first paragraph – Can MoT speculate as to the amount of secondary particulate formation that may result given increased ammonia? Findings from the GVRD suggest ammonia emissions are increasing in the region, may have significant impact on secondary particulate matter formation, visibility (from white haze) and human health. (WLAP)	As part of the Pacific 2001, ammonia measurements were made, but based on reviewed literature, very few published measurements of ammonia and their relationship to speciated particulate concentrations have been conducted in either the STS corridor or Greater Vancouver Regional District (GVRD) to date. As of October 30th 2003, the measured data from Pacific 2001 was not yet publicly available. Thus, it is difficult to speculate as to the amount of secondary particulate that may result. It is important to note that ammonia alone is not solely responsible for the potential formation of secondary particulate. Its interaction with NOx and SOx also plays a key role, and these contaminants are expected to improve over the assessment period.	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
4. AIR QUALITY		
Pg 57, Figure 5-1 VOCs in this graph aren't the pollutants of focal concern (PM would be much more relevant). (WLAP)	Although VOCs were shown for illustration purposes, the pattern is the same for the other CACs (except ammonia). GHGs are addressed separately in Volume 5, Section C, Section 6, and the project increase is presented in Table 6-1.	Satisfactorily addressed for the purposes of the EA review
Pg 58/59 - statements conflict with the definition of induced demand. Induced demand by definition only refers to new travel, and does not include diverted trips or mode shifting. (WLAP)	Based on the increased traffic demand in the STS corridor in future years, the predicted GHGs will increase within the corridor as a result. International forums have identified GHGs for reduction (e.g. Kyoto Protocol), and since GHGs do not have a direct environmental/health impact on the airshed, but are primarily a global concern, other mechanisms that have the capability to impact a larger scale (e.g. federal or global) are well suited to address this increase. The increase in GHGs is outlined in Table 6-1. It is recognized that based on the current emission factors, GHGs will increase with the increased amount of fuel consumed in the airshed.	Satisfactorily addressed for the purposes of the EA review
If the decision to build the tunnel is approved, and there are pedestrian, recreation or residential areas nearby, a continuous particulate matter monitor program should be installed. (WLAP)	The area for which the increased predicted concentration is to occur is situated directly at the north exit of the tunnel. This represents a very small area and does not intersect with a recreational or residential area. Regarding pedestrian access through the tunnel the extremely short-term nature of the activity, does not warrant installation of a continuous air quality monitor at this site.	Satisfactorily addressed for the purposes of the EA review
Pg 92, 1st paragraph – Re: positive improvement for emissions - Exceptions are ammonia *and* greenhouse gases. (WLAP)	This statement was intended to refer specifically to air quality (CAC) parameters, and not to GHGs, which were dealt with in separate sections within the report. It is recognized that GHGs are predicted to increase within the STS airshed due to the increase in vehicle traffic in the corridor.	Satisfactorily addressed for the purposes of the EA review
4. WILDLIFE AND VEGETATION		
MoT should commit to complete any outstanding Tailed Frog and Tailed Frog habitat inventory and assessment (as discussed in the Recommendations section of the Application, and as per the Ascaphus Consulting report dated May 28, 2003) and to work with Ascaphus Consulting to complete specific stream crossing/Tailed Frog habitat management and impact mitigation on important Tailed Frog streams. (WLAP).	Ascaphus Consulting has completed the ranking of Tailed Frog streams along the corridor and the MoT will be discussing mitigation and management measures with Ascaphus Consulting. Any unmitigated impacts of culvert extensions on fish and amphibian habitats will be offset with the application of special measures. This will include special considerations for amphibians during the design of specific fish habitat compensation works, along with additional measures to address any amphibian habitat impacts that can not be offset in conjunction with fish habitat compensation (i.e. Tailed Frog habitats). 27-11-03	Satisfactorily addressed for the purposes of the EA review OCR 1.2, 5.12
Regionally rare and significant plants of the area were presented in the EA, but the plants listed by the First Nations do not appear to be included. (SLFN)	In the absence of further direction from the First Nations representative identifying what information should be included or referenced in the Application the MoT did not presume to describe specific elements of First Nations' interests and issues in advance of receiving the AIUS. RESL developed a spreadsheet containing a database of plant species documented during its vegetation surveys and forwarded this database via the appropriate channels to the Squamish and Lil'Wat Nations.	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
5. WILDLIFE AND VEGETATION		
Wildlife and fish distribution and use of the project area varies seasonally. First Nations reviewers request that the impacts of the upgrade project on wildlife and fish be assessed on a seasonal basis. (SLFN)	Wildlife monitoring requirements associated with the project are currently under discussions with EC and MWLAP. Long term monitoring requirements will likely be specified within the Environmental Management Plan.	Satisfactorily addressed for the purposes of the EA review
Request long-term wildlife impact monitoring along the entire project route. (TWFN)	Wildlife monitoring requirements associated with the project are currently under discussions with EC and MWLAP. Long term monitoring requirements will likely be specified within the Environmental Management Plan.	Satisfactorily addressed for the purposes of the EA review OCR 1.2, 4.21
There is no discussion on the fate of the waste rock from the tunnel excavation. Will existing vegetated areas be cleared and grubbed for sorting and transporting rock? DFO	The MoT Westport pit has been designated as a stockpile and processing site for rock from tunnel excavation (See Volume 1 – Map and Drawing Portfolio Drawing no. 41DKPAHS- 0451). The contractor may, at their option, remove excavated rock and utilize it on or outside the project.	Satisfactorily addressed for the purposes of the EA review
6. BIRDS		
Recommend March 15 – July 31 general breeding bird period be avoided. Any required overlap with this period be addressed through the submission and review of nest survey data. (EC)	OCR 4.5, 4.19	Satisfactorily addressed for the purposes of the EA review
Will spotted owl surveys be conducted? (SLFN)	Spotted owl surveys in specific locations will be required. RESL is currently preparing plans to conduct these surveys, starting in early spring 2004. (EAO Note: The MoT advised the BTWG on April 20 2004 that the surveys have been completed and the report is pending)	Satisfactorily addressed for the purposes of the EA review OCR 4.6
Coopersdhawk nests located near the right-of-way were not reported in the EA. Can the RESL personnel involved in the EA preparation investigate this issue?	The subject nests, observed in June 2003 were not occupied leading to speculation about which species might have used them. A field inspection, to be scheduled for late April 2004 should clarify what species is using these particular nests. The results will be reported via memo to the STS project team for appropriate dissemination.	Satisfactorily addressed for the purposes of the EA review
A Registered Professional Biologist (RP Bio.) should be specified as the wildlife professional responsible for monitoring trees with nesting potential for marbled murrelet. (SLFN)	MoT OCR 4.7	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
7. FISH, FISH HABITAT AND AQUATIC RESOURCES		
Request long-term water quality monitoring process along the entire project route. (TWFN)	A water quality program has been developed in consultation with relevant federal and provincial agencies. Relevant components of this program will be included within the Environmental Management Plan. Once completed, MoT would be please to provide a copy to the TWFN.	Satisfactorily addressed for the purposes of the EA review OCR 1.2, 10.1
In the fisheries and aquatic habitats section, mention is made of showing ‘no disturbance˝ riparian areas on construction drawings. The First Nations would like to see these areas now, not after the project is approved. (SLFN)	It is not feasible to finalize these ‘no disturbance˝ details at this time. The riparian impact estimates in Tables 3-1 and 3-2 in Volume 2, Section B of the Application provide ‘worst case˝ estimates that are expected to be further reduced during detailed design planning. DFO authorizations for locations where impacts to fish habitat cannot be avoided will be required before construction works can begin at individual sites. Final details on ‘no disturbance˝ will be addressed during the permitting/approval stage.	Satisfactorily addressed for the purposes of the EA review
Wildlife and fish distribution and use of the project area varies seasonally. First Nations reviewers request that the impacts of the upgrade project on wildlife and fish be assessed on a seasonal basis. (SLFN)	All seasons were captured as part of the wildlife and fish assessments.	Satisfactorily addressed for the purposes of the EA review
Section 3.1.3 states that visual inspections were conducted to determine the arrival and overwintering of steelhead in selected watercourses during December 2002 and January 2003. What standards were used for these visual inspections? Did these inspections follow a standardized procedure with respect to reach length and time surveyed? (SLFN)	These were reconnaissance-level visual inspections, undertaken by fisheries biologists and technicians in conjunction with other field program tasks. The field work focused on the collection of information that was most critical to the Project.	Satisfactorily addressed for the purposes of the EA review
MoT must provide a reasonable amount of detail on fish habitat, (and habitat compensation) that will be authorized for alteration, disruption and destruction (HADD) under section 35.(2) of the *Fisheries Act*.	During the November 3, 2003 meeting, DFO clarified that there is no need for the MoT to provide additional fish habitat inventory information and that the MoT need focus on resolving the following crossing sites: Middle Creek, Mamquam Blind Channel, Mamquam River, Mashiter Spawning Channel, Meighan Creek and side channel, Thunderbird Creek, Newport Creek, Hop Ranch Creek and the unnamed tributary to the Brohm River.	Satisfactorily addressed for the purposes of the EA review OCR 5.16
How will changes to the upland hydrology effect the receiving waters of Howe Sound? (DFO)	Measures are implemented to avoid stream bank erosion, scour of channel beds and sedimentation processes that have the potential to affect downstream waters. Approximately 40% of the total highway ditch system will be improved to the new standards. In localized areas where erosion is a concern, mitigation methods such as rip rap or bio-engineered bank stabilization are used.	Satisfactorily addressed for the purposes of the EA review OCR 1.2, 5.4, 5.5, 10.3, 10.10, 10.13, 10.15

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
7.1 Stream Crossings		
The DFO hierarchy of preferred options is: relocation, redesign, mitigation; and last, habitat compensation. DFO will only authorize HADDs if given compelling technical rational why the first three other options are impossible or impractical. (DFO)	This DFO comment refers to the crossing sites identified in the DFO October 24, 2003 letter. In addition to these crossing sites, MoT has also prepared additional information related to the Horseshoe Bay Overhead structure at Larsen Creek and culvert works at Dryden Creek. The technical information package for the crossing sites identified in the DFO letter and these two additional sites is included as an attachment to this letter.	Satisfactorily addressed for the purposes of the EA review OCR 5.16
DFO requires clear span structures on all fish bearing streams and that clear span structures are preferred on non fish bearing streams. (DFO)	This DFO comment refers to the bridges that are currently proposed by the MoT as part of the project scope. Only 2 fish bearing water features associated with the project have proposed bridge works that are not clear span structures and would require instream piers. These 2 water features are the Mamquam Blind Channel and the Mamquam River, for which preliminary design plans propose piers within the wetted perimeter. There are no other non-clear span bridges proposed for modification or installation on fish bearing water features associated with the Project.	Satisfactorily addressed for the purposes of the EA review OCR 5.7
WLAP encourages MOT to pursue the new "alternative option" for replacement of the Horseshoe Bay overhead structure to minimize overall habitat impacts to Larsen Creek. (WLAP)	The MoT agrees that the alternate design option, as outlined in the October 10, 2003 letter from Coast River Environmental Services, represents an improvement over the original proposal.	Satisfactorily addressed for the purposes of the EA review
If MoT intends to pursue closed culvert installation and not open bottomed structures at Middle Creek, strong technical rational needs to be developed in order to support that proposal. (WLAP)	MoT commits to install an open bottom structure at this location, unless a technical rationale documenting why a closed bottom structure is more acceptable at this location is developed by the MoT and accepted by WLAP and DFO during the permitting/authorization phase.	Satisfactorily addressed for the purposes of the EA review OCR 5.14
WLAP supports an "on existing alignment" option at Thistle Creek. By using headwall structures, it may not be necessary to extend the existing culvert. (WLAP)	The "on existing alignment" is the preferred option. There may be no need to extend the existing culvert.	Satisfactorily addressed for the purposes of the EA review
Mashiter Complex: WLAP supports MOT commitment to lowering the two existing culverts under the Hwy in order to improve hydrological function. (WLAP)	There is only one existing culvert at the Mashiter Spawning Channel crossing location. The MoT commits to lower the invert of this culvert to improve the likelihood of success for any future restoration opportunities.	Satisfactorily addressed for the purposes of the EA review OCR 5.17
Two projects to consider as compensation measures are replacing the existing flood gates at Loggers Lane with new remote or tide activated gates and replacement of a culvert at Wilson Slough and Buckley Avenue. (DoS)	EAO Note: This is an information item.	OCR 5.16

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
7.1 Stream Crossings		
Baffles are prone to clogging with debris and sediment that can cause the culvert to fail or force water through it at higher velocities. Baffles can also disrupt the boundary layer, resulting in impaired juvenile fish passage. (DFO)	EAO Note: This is an information item. Detailed design issues will be addressed as part of the *Fisheries Act* authorization process	No further information required for the purposes of the EA review.
At Mamquam Blind Channel no rational given why a temporary bridge must be installed. What other detour options have been explored that could avoid a HADD? (DFO)	A temporary traffic bypass is required in order to demolish the existing highway bridge and build a new bridge that .straddles the alignment of the existing structure. This bypass, which will need to be located outside of the area proposed for construction of the new 4-lane bridge, will need to maintain 2 directions of traffic flow across the Mamquam Blind Channel at all times during construction.	Satisfactorily addressed for the purposes of the EA review
Centennial Way to Depot Road - the Application does not give any specific information on the culvert extension designs such as headwalls. (DFO)	Mitigation measures (e.g. headwalls and/or retaining walls) will be applied to the final design	OCR 5.15
Depot Road to Brohm Lake - The Application does not specify what kind of culvert extensions will be used in Tables 3-1 and 3-2. (DFO)	Although Table 3-1 in Volume 2, Section B indicates that culvert extensions may be required, efforts will be made at detailed design work to mitigate instream habitat impacts. Based on the outcome of design planning for the nearby Meighan Creek, Meighan Creek Side Channel, and Thunderbird Creek crossing locations (refer to design drawing No. 41DK-PAHS-9904), it is anticipated culvert extensions can be either avoided or minimized on Newport, Hop Ranch and Dryden Creeks through the installation of headwalls and/or retaining walls.	Satisfactorily addressed for the purposes of the EA review OCR 5.7
Cheakamus Canyon to North Garibaldi Civil Defense Zone Many of the wetland features were dry during sampling and should be assessed during the fall sampling period. (DFO)	EAO Note: This is an information item. Detailed design issues will be addressed as part of the *Fisheries Act* authorization process	
The Canadian Coast Guard Navigable Waters Protection Division would like to see plans for the Culliton Creek bridge since at the time it was built it was declared non navigable. (DFO)	EAO Note: Information Item.	
Prefer that the Mamquam Blind Channel bridge is rebuilt as a clear span bridge with no reduction in overhead clearances. (CCG)	MoT will consider this during detailed design of the structure. There are substantial design constraints to be considered and these are discussed in The Technical Information Package - Attachment to Letter from the MoT to DFO November 28, 2003.	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
7.2 Tunnel Option		
Bore tunnels, may raise significant issues or concerns in relations to fisheries issues because: • there is the potential to expose pyretic bearing basaltic rock that could cause acid rock drainage; • the volume of slurry produced in the tunnel could be substantial if ground water is encountered; • the North Shore mountains are prone to intense fall storm events; • there appears to be limited area to construct sediment control structures. Until logistics are addressed in detailed plans by a qualified engineer, it's speculative whether they are feasible. (DFO)	The "South Portal – 1 km Tunnel Couplet" drawing in the Volume 1 –Map and Drawing Portfolio was prepared by McElhanney Consulting Services Ltd., and indicates there is sufficient space to manage water from the tunnel both during and following construction. Groundwater intercepted by the tunnel will be isolated and directed in a "clean" state and any construction/operations wastewater or spills will be addressed through the collection, treatment, and infiltration infrastructure identified on this drawing. Any construction works, including the handling of waste rock, will ensure that an adequate riparian buffer is maintained and that effective erosion and sediment control measures are applied. The tunnel alignment is entirely within granodiorites of the Coast Pluton, which have no visible sulphides. Analysis by Golder Associates show that rock in the vicinity of the tunnel has neutralization potential ratios (NP/AP) in the order of 12 to 31 and are definitely not acid generating.	Satisfactorily addressed for the purposes of the EA review OCR 5.8, 5.9
Preventing contaminates from spills or accidents in the operating tunnel from entering the creek has not been refined and the Application only gives an example of how maintaining water quality could be mitigated. DFO	Tunnel construction will be drill and blast rather than bored. Fines generated by drill and blast operations would be comparable to surface excavation of rock by drill and blast and much will remain within the tunnel. Expect that volumes of water entering the tunnel will be minor and waste water during construction can be managed.	Satisfactorily addressed for the purposes of the EA review OCR 5.9, 10.3
8. ENVIRONMENTAL MANAGEMENT PLANS		
MoT states that based on the outcome of the studies and risk assessment, water quality monitoring immediately prior to, during and after construction would be undertaken for all areas with sensitive streams to determine the need for mitigation. Water quality monitoring should be required regardless of the outcome of the risk assessment to resolve uncertainty with the predictions of "first-flush" water chemistry and confirm there will be no adverse environmental effects. If during the construction period significant data confirms no concern, the need for (or frequency of) on-going monitoring could be re-evaluated. (MEM)	The MoT has committed to developing an Environmental Management Plan prior to construction start-up, in accordance with or equivalent to the provisions of Section 165 of MoT's *Standard Specifications for Highway Construction (hereafter referred to as Section 165)*, to convey an understanding of the project's environmental constraints (including construction timing) and how the Project will be undertaken to avoid/mitigate negative impacts. The Environmental Management Plan(s) (EMP) will be submitted to the appropriate environmental agency for acceptance before work commences. OCR 1.2	Satisfactorily addressed for the purposes of the EA review
Information on mitigation techniques, environmental inspector's roles and responsibilities and instructions to highway construction contractors should be presented in the EA to demonstrate how environmental protection measures will be applied during all phases of the project (i.e. planning, construction, restoration and operation). (SLFN)	The MoT will retain an environmental monitor to work on-site during all phases of highway construction. The monitor will work with the Contractor to ensure the protection of the environment, that mitigation measures are appropriately implemented and to facilitate communication between the Contractor, environmental agencies, and MoT. OCR 1.6	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
9. ENVIRONMENTAL MANAGEMENT PLANS		
Management plans or programs required: • for various re-use/disposal areas, • for rock cuts near sensitive steams • for re-use/disposal areas, • to ensure that the ML/ARD predictive information, PAG management plans, mitigation measures and monitoring requirements are available and understood by all contractors during the design and construction phases; and • for ML/ARD construction monitoring. Include methods for on-going assessment of ML/ARD characteristics during construction and materials handling protocols.	A water quality sampling and analysis program will be undertaken by the MoT. Water sampling and analysis will be conducted where there are rock cuts in PAG or ML rock material. The sampling of water runoff will be conducted in sensitive streams and highway ditches. The MoT will retain a qualified consultant to monitor potential for acid generation and metals content through construction. The consultant will recommend specific mitigative strategies to best address conditions as encountered. Mitigation could include drainage management or shotcreting rock faces to prevent oxidation.	Satisfactorily addressed for the purposes of the EA review OCR 1,2, 2.4, 10.1
This project will take more than six years to complete and it is expected that the current DFO environmental standards and BMPs are adhered to. Also, the Environmental Protection Plan (EPP) should be updated annually. (DFO)	The MoT commits that any updated best management practices developed during the course of this project will be applied. The MoT considers the Environmental Management Plan to be a live document to be updated throughout the construction period as issues arise. OCR 5,7 for finalizing crossing structure designs	Satisfactorily addressed for the purposes of the EA review
Explain what training and equipment the highway maintenance contractors have to minimize the environmental impacts of a spill until proper authorities arrive. (EC).	The MoT will require that operational activities be carried out in accordance with, or using means equivalent to, applicable Ministry policies and procedures, including the MoT's *Emergency Response Plan* which outlines what actions maintenance contractors and Ministry Area Managers must take in the event of a hazardous spill. OCR 1.2 and 4.23	Satisfactorily addressed for the purposes of the EA review
In developing drainage systems and water quality management plan consider the following objectives: • Avoid diverting water from one watershed to another ; • Manage development so storm water characteristics emulate the pre-development natural watershed; • Treat first flush events for water quality; e.g. swales, wetlands and other polishing treatments; • Limit effective impervious area; • Maximize forest cover, green spaces & vegetated areas. (EC)	See attachment: *Water Quality Monitoring Program Sea-to-Sky Highway Improvement Project* (November 26, 2003) for more detail.	Satisfactorily addressed for the purposes of the EA review
Include a water sampling program and planning to respond to fuel or other spills along the route of the project. (TWFN)	A water quality monitoring program will be developed for regulatory agency review and approval (WLAP, MEM and EC) and will be incorporated into the Environmental Management Plan. This documentation can be provided to the TWFN.	Satisfactorily addressed for the purposes of the EA review OCR 10.1

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
8. ENVIRONMENTAL MANAGEMENT PLANS		
An Air Quality Monitoring and Mitigation Action Plan should be devised for the construction period that outlines when and where monitoring will be done and what mitigative actions will be taken if certain measurement thresholds are reached. This is particularly important for fine particulate matter emissions. (WLAP).	A number of air quality monitoring and mitigation items were identified in the Application (Volume 5, Section A – Summary, Section 1.2.5, pg 17). Finer details of the monitoring and mitigation will be in the Environmental Management Plan, once further details on contractors, construction timing, detailed designs and locations are established. The municipal by-laws and open burning regulations outline the details of permits required and guidelines to follow for safe reliable burning. Currently, the municipalities in the Lower STS corridor do not allow open burning within their by-laws.	Satisfactorily addressed for the purposes of the EA review OCR 1.2, 6.2, 6.3
The creation of an Air Quality Monitoring and Mitigation Action Plan prior to the construction, and implementation of this plan during construction, would ensure the health and safety of Sea-to-Sky corridor residents and workers. (WLAP)		Satisfactorily addressed for the purposes of the EA review OCR 6.2
Place air quality monitoring stations at several location along the corridor to gather better data for long-term review and base-line comparison purposes (TWFN)	Based on the air quality modeling which used conservative assumptions, the ambient air quality for all criteria air contaminants would remain below the applicable ambient objects. The MoT has committed to conducting additional air quality monitoring during the construction phase of the project. This data can be used to establish the contribution of the road to air quality in the immediate vicinity, particularly during construction when the highest concentrations are predicted. Existing regional stations can continue to be used to establish the long term concentrations and compliance within the airshed	Satisfactorily addressed for the purposes of the EA review OCR 6.2
Create a Vegetative Debris Disposal and Monitoring Plan, prior to construction. (WLAP)	The MoT will develop a Vegetation Debris Management Plan. OCR 1.2 and 6.	Satisfactorily addressed for the purposes of the EA review
Recommend creation of the Vegetative Debris Disposal Plan, as briefly outlined in this document, is also a positive step in reducing particulate matter emissions. It is recommended that the disposal plan and monitoring/mitigation plan be created prior to construction phase. Anticipated that the stakeholders will be the same for both planning exercises, and that they could theoretically do the work for both plans at the same time. (WLAP).	The MoT has committed to a Vegetative Debris Disposal Plan (Application - Volume 5, Section A – Summary, Section 1.2.5, pg. 17). This plan will be developed for the pertinent construction areas and encompassed in the Environmental Management Plan.	Satisfactorily addressed for the purposes of the EA review OCR 1.2, 6.2, 6.3
Will daily environmental inspection reports for work conducted on IR#24 be provided to the Squamish Nation? (SLFN)	Depending on the nature and scope of work being undertaken, bi-weekly monitoring reports would be a more standard reporting frequency for this type of undertaking. However, discussions are underway regarding the appointment of an individual to liaise between the MoT, highway contractors, and the Squamish Nation in relation to the work required through IR#24. More refined reporting responsibilities to the Squamish Nation could well form a component of this arrangement.	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
8. ENVIRONMENTAL MANAGEMENT PLANS		
More detail is required with regard to how the various stated goals will be attained. For instance, how will the Ministry ensure that the width of the cleared edge beside the highway will be minimized? How will designs be affected to reflect this change? How will equipment operators be informed of vegetation protection measures? What will happen if design and construction specifications are not met? (SLFN)	The construction contractors will be permitted to clear the minimum required to construct the highway improvements. This requirement will be clearly described in the contract documents. The contractors will be required to develop and submit environment management plans prior to starting construction work. These plans will include, among other measures, their methodology for ensuring all of their staff are knowledgeable of the requirements for minimizing vegetation removal. Generally the clearing limits are staked or flagged in the field to define the boundaries to the operators. The contractors will also be required to retain an on-site environmental monitor to ensure the environmental management plan is adhered to. The MoT will also undertake environmental quality audits to ensure compliance.	Satisfactorily addressed for the purposes of the EA review OCR 1.2, 1.6, 1.7

SEA-TO-SKY HIGHWAY IMPROVEMENT PROJECT ASSESSMENT REPORT

APPENDIX 1B

SOCIO-ECONOMIC ISSUES TRACKING

List of Acronyms Used in Appendix 1B

AR	Assessment Report
AIUS	Aboriginal Interest and Use Study
BCR	BC Rail
BMP	Best Management Practices
BTWG	Biophysical/Technical Working Group (established by the EAO)
CAG	Community Advisory Group
DoS	District of Squamish
EA	Environmental Assessment
EAO	Environmental Assessment Office
ELD	Electoral Area ˇDˆ
GVRD	Greater Vancouver Regional District
HC	Health Canada
LB	Village of Lions Bay
Mayors	Corridor Mayors (West Vancouver, Lions Bay, Squamish, Whistler, Pemberton)
OCR	Owner‡s Commitments and Responsibilities – Sea to Sky Highway Improvement Project (MoT)
RMOW	Resort Municipality of Whistler
SEWG	Socio-Economic Working Group (established by the EAO)
SLFN	Squamish and Lil‡wat First Nations
SLRD	Squamish-Lillooet Regional District
TDM	Transportation Demand Management
TLC	Technical Liaison Committee
TWFN	Tsleil-Waututh First Nation
VCHA	Vancouver Coastal Health Authority
West Van	District of West Vancouver

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
1. Project Design (General)		
The time horizon for the project should be extended beyond 2025 and employ a goal of minimizing potential negative impacts to each community, especially in the higher growth areas in the southern end of the corridor. A longer-term horizon such as 2050 may be more appropriate for planning purposes. The longer the horizon, the better we will be able to address traffic flows, and land use planning. (Mayors)	The planning horizon and scope of project was developed in consultation with corridor communities who asked that the original scope of the project ($1.2 billion) be reduced to meet demand rather than promote growth. The planning horizon for the project includes short, medium and long-term planning. Improvements are to meet demand without promoting growth to levels that might exceed the region’s ability to provide services (e.g. housing, infrastructure). Longer-term planning is underway to meet demands for the movement of goods and people beyond 2020.	Response satisfactory for the purposes of the EA review
The $600 million allocated to this project may limit the MOT’s ability to consider implementing appropriate measures such as the most efficient tunnel option. (Mayors)	Safety and reliability are the highest considerations. The MoT is currently considering three options for the alignment in West Vancouver and these will be further discussed with Mayor and Council, staff, affected neighborhoods, first responders and other stakeholders. This input will be carefully considered, along with technical and financial issues when selecting a preferred option. ***EAO Note**: Since this comment was provided, the MoT undertook additional consultation and design work on options for the alignment in West Vancouver. The results are reported in the West Vancouver Clarification Report and were reviewed by the BTWG and the SEWG.*	Response satisfactory for the purposes of the EA review
Current economic evaluation based on a 20-year horizon is gravely flawed because it diminishes safety, operational and land costs for an infrastructure investment which will have a lifecycle exceeding 50 and probably 100 years. (West Van)	***EAO Note**: See above responses*	Response satisfactory for the purposes of the EA review
Average travel time from Horseshoe Bay and Whistler may increase by 14 minutes, due to increased traffic and congestion in the southern portion of the corridor. Not clear that this level of congestion justifies the expenditure of more than $600 million. Only through long-term, consistent, and effective land use and traffic management actions can growth of motor vehicle traffic be controlled. (SLFN)	***EAO Note**: See above responses*	Response satisfactory for the purposes of the EA review
Scarce resources should not be expended on highway improvements that are throw away following the Olympics. Timelines should be clearly established for subsequent upgrades or future alternate routes as part of the current planning process. (DoS)	The project team will endeavor to reduce or eliminate "throwaway" costs and optimize the value to the public with this project.	Response satisfactory for the purposes of the EA review
The `Olympic Solution˜ proposed is to build a third lane on the BC Rail right-of-way for the Olympic period and to dismantle this lane following the Olympics. In the minds of many, this is a waste of taxpayers’ money that would be better applied to a more permanent solution. (ELD)	The project team shares the concern that provision of a temporary third lane on the BC Rail right of way, for the period of the Winter Olympic Games, may not represent the best value to the public. The MoT plans to retain a highway engineering consultant to study various options in this area, where improvements to the ultimate design standard have been deferred until some time after 2010.	Response satisfactory for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
1. Project Design (General)		
Proper highway upgrades must minimize negative impacts to the quality of life for each community. This would include consideration of integrating the highway upgrades into the long-term plan for the region, a mitigation plan that addresses consistent and well-communicated closure regimes, and community highway access. (Mayors)	MoT is committed to completing the improvements by 2009. There shall be no closures or scheduled delays during December, January and February. Daytime and nighttime closures will avoid June, July, August where possible with no disruption of traffic on Friday, Saturday and Sunday. *(See also OCR 7.1 – 7.6)*	Response satisfactory for the purposes of the EA review
Consideration of the Sea-to-Sky transportation plan should be done within the context of a fully integrated, multi-modal, sustainable transportation strategy that defines a future vision of transportation regionally and within a provincial context. (ELD)	***EAO Note**: This issue is beyond the scope of the EA review.*	
The difference in community impacts between 60kph and 80kph operating speeds would be huge while the difference in travel time would be small. (DoS)	With respect to traffic calming, the MoT intends to work with the DoS to develop appropriate urban character into the highway, by applying CSD concepts.	Satisfactorily addressed for the purposes of the EA review
The section of the SEI dealing with travel to school (Section 2.6.1) would be better if the pedestrian and cyclist routes were documented so potential impacts on student safety could be identified. (SLFN)	***EAO Note**: Point of information. No response required.*	
With respect to the proponent's statement that impacts of increased population will be controlled by planning, there is no record that "population control" is a goal of local planning in some communities along the proposed corridor. Need for an independent assessment of population growth impacts of the proposed project and other proposed economic development projects in the same region. (TWFN)	Generally, issues related to growth are controlled by land use planning mechanisms and are a function of local government initiatives and/or control. The MoT is of the view that this level of analysis is beyond the scope of potential project related impacts and the associated EA Review process. ***EAO Note**: The study of induced population growth is beyond the scope of the EA review.*	No further information required for the purposes of the EA review
Reporting out by the proponent on an annual basis on average transit times by month for peak travel periods between Whistler and downtown Vancouver, average travel times by month for peak travel periods between Squamish and downtown Vancouver and monthly vehicle accident rates. These figures will assist the public in assessing the return on the investment achieved by construction of the proposed project. (TWFN)	MoT will continue to track traffic volumes, accident rates, etc. as part of the relevant and applicable provincial programs. Issues related to project viability and satisfying the "public interest" have been addressed by the Treasury Board and provincial Cabinet.	No further information required for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
1. Project Design (Specific Locations)		
1.1 West Vancouver		
Complete a comprehensive analysis of the tunnel and couplet options from West Vancouver towards Lions Bay, including potential access impacts to Horseshoe Bay area residents in consultation with the District of West Vancouver. (Mayors)	The MoT is currently considering three options for the alignment in West Vancouver and these will be further discussed with Mayor and Council, staff, affected neighborhoods, first responders and other stakeholders. This input will be carefully considered, along with technical and financial issues when selecting a preferred option. ***EAO Note****: Since this comment was provided, the MoT undertook additional consultation and design work on options for the alignment in West Vancouver. The results are reported in the West Vancouver Clarification Report and were reviewed by the BTWG and the SEWG.*	No further information required for the purposes of the EA review
A 3 kilometre tunnel from Westport Road (Eagle Creek) to Pasco Road represents the optimum solution in terms of safety, capacity, environmental impact, long term overall economic and functional performance. (West Van)	The MoT has no information to support this. A recent analysis by KPMG regarding the timeframe for benefit cost analysis, comparison of options, effects of land values and loss of incremental property taxes concluded the short tunnel couplet option better public value by a significant margin.	No further information required for the purposes of the EA review
Additional two-lane road with two-way functionality can provide all of the required capacity for 25 years and probably 50 years if a third lane is added. In this way all needs can be met and the overall safety and mobility will be superior to a couplet. (West Van)	Analysis concluded the couplet option, in comparison to the two-way operation, resulted in reduction in collision frequency ranging from 29% to over 40%, depending on the traffic split between the two two-way roadways. In terms of highway safety, the couplet option is clearly safer than the two-way option.	No further information required for the purposes of the EA review
Much of the traffic volume/safety/capacity analysis was undertaken with computer models. Safety implications of permanently detouring Sea-to-Sky northbound traffic from all points north of Caulfield Interchange (including ferry traffic) back through the Caulfield Interchange have been ignored. (West Van)	The concept illustrated in the Project Application has traffic diverted back to Caulfield Interchange and we definitely want to improve on this. We will continue to work with the District to identify means to mitigate the impacts to local traffic. For all three traffic split analyses completed, the LOS of the two-way tunnel, from present to the 2025 horizon year, was unacceptable. The couplet option performs significantly better. ***EAO Note****: Since this comment was provided, the MoT undertook additional consultation and design work on options for the alignment in West Vancouver. The results are reported in the West Vancouver Clarification Report and were reviewed by the BTWG and the SEWG.*	No further information required for the purposes of the EA review
Two lanes northbound on a new alignment above the existing highway, from Nelson Creek to Ansell Place, and two lanes southbound on the existing highway will impact emergency response times (add 10 minutes) and severely affect accessibility to properties along this 6 kilometre section. (West Van)	The project team will make improvements to the couplet concept presented in the Project Application. The MoT wants to reduce the impacts to both emergency response and local mobility between Horseshoe Bay and the southern Howe Sound communities and is working hard to develop solutions, which will be discussed with the District. ***EAO Note****: Since this comment was provided, the MoT undertook additional consultation and design work on options for the alignment in West Vancouver. The results are reported in the West Vancouver Clarification Report and were reviewed by the BTWG and the SEWG.*	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
Project Design (Specific Locations)		
1.2 Lions Bay		
A T-junction at Kelvin Grove will become a safety hazard due to unacceptable detours and pedestrian crossing (LB)	Current options being reviewed do not block left turns from Kelvin Grove. The options include a full movement intersection utilizing a below ground crossing of Highway 99 that would also accommodate east/west pedestrian crossings. ***EAO Note**: Since this comment was provided, the MoT undertook additional consultation and design work on options for the alignment in Lions Bay. The results are reported in the Lions Bay Clarification Report and were reviewed by the BTWG and the SEWG*	Satisfactorily addressed for the purposes of the EA review
Intersection at Brunswick Beach Road: what happens to the residents who live on the east side of the highway? There are considerable safety concerns regarding residential traffic mixing with gravel and construction trucks. (LB)	Current options being reviewed at Brunswick Beach Road would consolidate east and west side accesses to one common intersection. The options include a full movement intersection utilizing a below ground crossing of highway 99 that would also accommodate east/west pedestrian movements. ***EAO Note**: Since this comment was provided, the MoT undertook additional consultation and design work on options for the alignment in Lions Bay. The results are reported in the Lions Bay Clarification Report and were reviewed by the BTWG and the SEWG*	Satisfactorily addressed for the purposes of the EA review
Intersection at Detour 4 has such insufficient detail so resident access to homes, crossings of the detour during its use, and pedestrian safety difficult to assess. Leaving these details to CAG is not acceptable. (LB)	The BC Rail Construction Detour is no longer under consideration.	Satisfactorily addressed for the purposes of the EA review
Current plan to block left turns from lower Kelvin Grove would mean a 27 km. rather than a 1.4km drive for anyone taking their child to school, obtain mail, or go to the store in Lions Bay. (LB)	Current options being reviewed do not block left turns from Kelvin Grove. The options include a full movement intersection utilizing a below ground crossing of Highway 99 that would also accommodate east/west pedestrian crossings. ***EAO Note**: Since this comment was provided, the MoT undertook additional consultation and design work on options for the alignment in Lions Bay. The results are reported in the Lions Bay Clarification Report and were reviewed by the BTWG and the SEWG*	Satisfactorily addressed for the purposes of the EA review
There is no plan for pedestrian crossings in Lions Bay. (LB)	***EAO Note**: See Above Response*	
Too much of the planning for ˋsafer community access across the highway˜ is related to highway on ramps and off ramps rather than intersections which would allow for multi-directional movement. (LB)	Options being proposed include new access configurations at Kelvin Grove and Brunswick Beach. Improvements to existing interchange to central Lions Bay. Brunswick Beach intersection include underpass connection across highway and realignment of highway at highest accident location. ***EAO Note**: Since this comment was provided, the MoT undertook additional consultation and design work on options for the alignment in Lions Bay. The results are reported in the Lions Bay Clarification Report and were reviewed by the BTWG and the SEWG*	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
Project Design (Specific Locations)		
1.2 Lions Bay		
There are no details for access to and from Brunswick Beach across Detour 4, thus there is no mitigation considered for citizens of the Village. This is particularly problematic for plans during the Olympics when the detour is planned to be unsupervised (LB)	This BC Rail Construction Detour is no longer under consideration.	Satisfactorily addressed for the purposes of the EA review
The reduction to two lanes (going north) is after a curve, and includes an area designated for an intersection with Detour 4 and the Brunswick Pit (gravel and construction vehicles). This is a potential safety hazard, even beyond the construction phase. (LB)	This BC Rail Construction Detour is no longer under consideration.	Satisfactorily addressed for the purposes of the EA review
Emergency services in this Village will require full mobility at all intersections. (LB)	***EAO Note****: Since this comment was provided, the MoT undertook additional consultation and design work on options for the alignment in Lions Bay. The results are reported in the Lions Bay Clarification Report and were reviewed by the BTWG and the SEWG*	Satisfactorily addressed for the purposes of the EA review
Increase in vehicular traffic may have a possible increase in accidents and possible increased cost for the Fire Department, on top of the social costs of highway expansion. The MoT should provide some direction for mitigating probable increased emergency response costs. (LB)	***EAO Note****: While this issue is beyond the scope of the EA review it will be reported in the Assessment Report.*	No further information required for the purposes of the EA review
1.3 Lions Bay to Porteau Cove		
If blasting into or tunneling through the Porteau Bluffs is too expensive on the short term, perhaps moving the rail line over could enable construction of a permanent third lane. There should be safety improvements made to straighten curves and to improve the access and egress for Porteau Cove Provincial Park. A future tunnel solution at Porteau Bluffs is recommended. (ELD)	MoT plans to retain a highway engineering consultant to study various options in this area. One objective is to identify permanent improvements to the existing highway required to achieve ultimate design standard for the future one-way operation, as the future northbound couplet or southbound couplet.	Satisfactorily addressed for the purposes of the EA review
1.4 Porteau Cove to Furry Creek		
Prepare a long-term plan for the current 2-lane section between Lions Bay and Furry Creek that clearly shows how this section fulfills the project goals. (Mayors)	The project will improve the safety and reliability of the segment from Lions Bay to Furry Creek through improving site distance, widening and undertaking a large geotechnical stabilization program. This area will be subject to capacity constraints around 2020 and improvements will be required. The MoT would be pleased to review functional options for longer term construction (post 2020) with the corridor communities.	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
Project Design (Specific Locations)		
1.4 Porteau Cove to Furry Creek		
Construct the more permanent 3-lane option from Porteau Cove to Furry Creek. Placement of the third lane should consider the viewscape from uphill residences to mitigate or eliminate impact to the current visual quality. (ELD)	The MoT generally agrees with recommendation to construct a third permanent lane on the existing alignment, except that widening of the existing highway may only be feasible in the northerly part of this section, starting at about the Furry Creek sign at the highway/rail divergence. Third lane from this point to Porteau Cove will likely be on the BC Rail right of way.	No further information required for the purposes of the EA review
The assessment should include an analysis of the population, economic and commuter impacts of the proposed four laning of Lions Bay to Furry Creek in 2012-2015. Four lane highway access to Vancouver and the Lower Mainland from Squamish will likely produce major impacts on that community and the communities of Howe Sound. (SLRD)	The MoT studies indicate that the existing two lane highway will start to fail by 2017. Nevertheless, these are planning projections and the MoT can't say for sure when the four-lane improvements will be undertaken, or what other changes may have occurred by then that may also have influence. Therefore the socio-economic impact assessment was undertaken of the project scope included in this project	No further information required for the purposes of the EA review
If the 2-lane option, supplemented for the Olympics by a lane on the BC Rail right-of-way is required due to limited budget, the transition to the rail lane should be south of the Furry Creek Golf Course and the temporary lane should be removed ASAP following the Olympics. (ELD)	Construction of a third permanent lane on the existing alignment is the preliminary designer's preferred solution.	No further information required for the purposes of the EA review
Widen 2-lane bridge over Furry Creek to 3-lanes minimum or 4 lanes. Design should include a "shelf" under the bridge on the south bank of Furry Creek to enable the construction of a connecting pathway under the bridge for pedestrians to cross under the highway. (ELD)	The current preferred option is to construct a new two-lane bridge upstream of the existing bridges, retaining these bridges for southbound only.	No further information required for the purposes of the EA review
If, despite our recommendation, a 2-lane highway and the BC Rail Olympic solution is required between Porteau Cove and Furry Creek, the transition to the rail lane should be south of the Furry Creek Golf Course and the temporary lane should be removed ASAP following the Olympics. (ELD)	***EAO Note**: Point of Information.*	
Establish a reduced speed limit at Furry Creek to recognize that the highway is passing through a community. Install some traffic calming features. Support increased enforcement. (ELD)	The MoT will continue to work with the community to identify practical solutions to mitigate their concerns with highway noise, aesthetics and excessive speed	No further information required for the purposes of the EA review
How were winter driving conditions considered in the calculations of reductions in accident rates and how will driving at higher speeds in snow and rain will affect highway safety?	Analysis was based on preliminary alignment level design and not intended as a detailed safety review. More detailed safety analysis will be done at subsequent levels of preliminary and detailed design. The project is expected to improve safety by providing geometric improvements to allow travel at or about the posted speed limit for the majority of the time; providing capacity improvements to reduce vehicle platooning and resultant aggressive driver behavior; and reducing speeds through creation of urban character within the communities.	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
Project Design (Specific Locations)		
1.5 Britannia Beach		
Upgrade the highway to 3 lanes through Britannia Beach close to the existing alignment. To accommodate 3 lanes through a narrow section between Mining Museum buildings and the rail, move a short section of the rail line marginally to the west. (ELD)	The MoT generally agrees with this recommendations for the area, and the preliminary designer's preferred solutions are consistent with this also. The MoT recognizes the issues with access, egress and connectivity at the northern end of the community as well, and design improvements will address these issues.	No further information required for the purposes of the EA review
Construct a standard T intersection with a "smart light" at Main Street (the location of an existing right-of-way) to allow safe access and egress to the community and also to the foreshore. School buses and coaches are using unprotected access and egress points close to this location. The new intersection will also provide connectivity for pedestrians to the foreshore. (ELD)	The MoT recognizes the issues with access, egress and connectivity at the northern end of the community as well, and design improvements will address these issues. **EAO Note**: *These design detailed issues can be addressed post-EA.*	No further information required for the purposes of the EA review
Northbound right-in access to the businesses is desired, but may be difficult due to the short distance in relation to this interchange. If this is the case, signage is recommended to denote business access is via the interchange. (ELD)	**EAO Note**: *These detailed design issues can be addressed post-EA.*	No further information required for the purposes of the EA review
Install a second (bailey) bridge on the upstream side of the existing bridge to accommodate the third lane. This bridge could stay in place after the Olympics. In addition to enabling smooth traffic flow, this will allow for some straightening of the sharp curve immediately north of the existing bridge to provide additional sight distance for safety. Existing businesses should be protected, however the upstream bridge will result in reduced space for parking in the existing commercial area. Some noise mitigation requirement is recommended between the residences and the highway. (ELD)	**EAO Note**: *These detailed design issues can be addressed post-EA.*	No further information required for the purposes of the EA review
Install protected left turns to allow safe access and egress for the Ninety-Niner and Britannia restaurants and the Makin Lands entrance. (ELD)	**EAO Note**: *These detailed design issues can be addressed post-EA.*	No further information required for the purposes of the EA review
Longer term, the community supports a proposed bypass route east of Britannia Beach with the existing alignment used as an access road. A right of way has been negotiated for this future bypass. (ELD)	**EAO Note**: *Point of information.*	

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
Project Design (Specific Locations)		
1.6 Squamish		
There are several options for an alternative route to Squamish from the Lower Mainland including Indian Arm, Seymour and Capilano Watershed routes that warrant further consideration (ELD)	The alternate routes between Vancouver and Squamish, these are briefly discussed in Volume 1 of the Project Application. The ultimate improvements planned for the existing corridor will provide a good level of service for many years. When capacity beyond four lanes is required, the alternate routes will be reconsidered and may then be the best solution.	Satisfactorily addressed for the purposes of the EA review
Complete a detailed analysis of the proposed upgrades through Squamish, which adequately addresses the connectivity and livability of this community, in consultation with the District of Squamish. (Mayors)	The MoT intends to review its analysis of connectivity and livability issues with the District of Squamish to ensure the improvements enhance rather than detract from connectivity and livability.	No further information required for the purposes of the EA review
Widening of the highway through urban Squamish would tend to further sever the community and isolate pockets of development on either side of the highway and thwart the District's ongoing efforts to integrate these pockets into one community. Measures associated with east-west connectivity in the Squamish area require special attention. (DoS)	The project objective in this regard is to preserve and enhance, where possible, east-west connectivity across the highway. The designer will work closely with the District to address the bulleted points provide in the report from the DoS. ***EAO Note**: The MoT also commits to consult with the Project Technical Liaison Committee and work closely with key stakeholders, First Nations, and Community Advisory Groups to ensure that adverse impacts are identified and design features are developed to provide safe pedestrian, cyclist and vehicular movement to, from and across the Highway (OCR 8.3)*	Satisfactorily addressed for the purposes of the EA review
The District views amendments to the municipal road network, including frontage roads, to maintain and enhance east-west connectivity as STS Highway Project deliverables. (DoS)	The MoT recognize that improvements to the municipal road network will benefit community connectivity and will work with the District to identify how these improvements can be interfaced with the project. (See also above response)	Satisfactorily addressed for the purposes of the EA review
Squamish Valley Road, Paradise Valley Road and Ring Creek Road are key area access roads for recreation and rural communities. Safe connections to Highway 99 are required. (ELD)	***EAO Note**: See above response.*	No further information required for the purposes of the EA review
Safe pedestrian passage at all bridges; a continuous, paved pedestrian/ bike path from Valleycliffe to Brackendale; and access and parking for significant trail heads such as the Mamquam Spawning Channel, the Malamute and other trails. (DoS)	***EAO Note**: The MoT also commits to consult with the Project Technical Liaison Committee and work closely with key stakeholders, First Nations, and Community Advisory Groups to ensure that adverse impacts are identified and design features are developed to provide safe pedestrian, cyclist and vehicular movement to, from and across the Highway (OCR 8.3)*	No further information required for the purposes of the EA review
The DoS planning an Adventure Tourism and Visitors Centre on the east side of the Highway at Cleveland Avenue as a focal point. The Rock Climbing and Trails Communities ought to be involved as key stakeholders to the highway design process. (DoS)	***EAO Note:** The MoT has created a recreation focus group that is looking at all highway-related issues from a recreational perspective that will be brought back to the TLC. (SEWG Meeting of 03-03-04)*	No further information required for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
Project Design (Specific Locations)		
1.6 Squamish		
Access to industrial and commercial properties adjacent to the highway is a critically important design consideration. Access must be maintained or acceptable alternate means must be provided through the project. (DoS)	The project team will work closely with the District in identifying potential impacts to access, will seek solutions to mitigate these impacts and will ensure that temporary access during construction is considered in the development of traffic management strategies.	No further information required for the purposes of the EA review
Overhead Signage should be installed at strategic locations to notify travelers of Highway 99 construction delays and/or closures well in advance. An information station on the radio should be put into service and travelers should be referred to the radio station for the latest information. (ELD)	***EAO Note**: See OCR 7.1 – 7.6*	Satisfactorily addressed for the purposes of the EA review
1.7 Pinecrest/Black Tusk		
Option 1 offers the best protection for the Pinecrest water supply and the safety improvement of a single smart light controlled intersection. Noise mitigation for the communities is a built-in benefit of this option which is the option preferred by the communities. If Option 1 is too expensive, Option 2 is recommended. (ELD)	A comparative analysis of the three options was done using the Multiple Account Evaluation (MAE) methodology to evaluate the overall costs and benefits of the alternatives, including safety, environmental impacts, community benefits, capital costs, maintenance costs and highway user benefits. ***EAO Note**: On April 15, 2004 the MoT reported to the EAO that: "The MAE was presented to the Pinecrest/Black Tusk CAG on November 13, 2003. The MAE recommended Option 3, the re-engineering of the existing Highway 99 and expansion to 3 lanes. The CAG was to prepare minutes of the November 13 meeting and provide comments to the Project Team on the MAE. To date no minutes or comments have been received. The Project Team is committed to ongoing consultation with the community post-certification to address their concerns about safety and water quality. The Project Team recently met with the Pinecrest/Black Tusk CAG: on February 10 to provide an update on the Sea to Sky Project; and, on April 6 to discuss highway safety." (See also OCR 10.7 and 10.8)*	Satisfactorily addressed for the purposes of the EA review
1.8 Callaghan Valley Access/Egress		
Construct a new interchange. If traffic demand projections indicate, a split grade intersection may be required. Reposition the new access/egress point to the south of the current location and incorporate the minor access/egress points into a single safe access/egress solution. (ELD)	This intersection is currently being studied by other agencies. It is recognized that the intersection will need significant improvements, however since the ultimate traffic demand is currently unknown.	No further information required for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
Project Design (Specific Locations)		
1.9 Whistler		
Directional Signage, similar to the BC Ferry signs, should be implemented along routes to Whistler. Whistler banners along the routes would be a desirable or even preferred alternative. (ELD)	Signage will be reviewed on a corridor-wide basis as part of the project. The project team is interested in creating a corridor identity with corridor "branding" to help convey that identity to the traveling public.	No further information required for the purposes of the EA review
A minimum tire tread depth should be established and enforced for the winter months north of the salt sheds on the Sea-to-Sky Highway to increase safety and avoid delays and closures due to accidents or inability of vehicles to handle winter conditions. (ELD)	Regarding designating a part of the Sea to Sky Highway as a "mountain highway", this generally pertains to the winter and the designation does include enforceable regulations, including minimum allowable tire tread. Enforcement of these regulations is key. This recommendation will be considered.	No further information required for the purposes of the EA review
2. Noise		
Complete an analysis on mitigating highway noise and access issues within the Lions Bay area in consultation with the Village of Lions Bay. (Mayors)	**EAO Note:** *The MoT has committed to Work with the Lions Bay community to reduce current highway noise by 4 to 5 dB through mitigation measures, such as open graded asphalt and speed reduction. Further, MoT is prepared to work with the community to make best efforts to incorporate noise barriers and other noise mitigation efforts where effective, which could result in a further 5dB reduction. (OCR 9.4 and 9.5)*	Satisfactorily addressed for the purposes of the EA review
The widening of the highway and Increasing traffic volumes have the potential of increasing ambient noise levels at properties adjacent to the highway. Baseline noise data should be collected throughout the urban portion of the corridor and measures such as speed control, pavement type and buffering should be enlisted to maintain or reduce from present base levels. (DoS)	**EAO Note:** *The MoT has committed to further consultation as the Project moves to more detailed design and to reduce average noise levels in the noisier residential areas along the corridor (e.g., Lions Bay, IR#24 and urban Squamish) by specifying in contract documents the use of open graded asphalt that creates less tire noise. (OCR 9.4)*	No further information required for the purposes of the EA review
All baseline readings were taken in October in the middle of the week (Tuesday, Oct. 22 and Wednesday, Oct.23, 2002). Within this application the MoT acknowledges that not only is October the next to the lowest vehicular volume (November is lower) but weekday volumes are lower than on weekends (Vol. 3, C 2.1.2.1). This means all baseline readings being used to determine noise levels are **not** representative of even average values for traffic noise. (LB)	Actual readings are calibrated and factored, taking into consideration the location and day of the week that the sample was taken, before they are used in modeling. An independent review of the noise data collection and modeling work by an internationally recognized authority was done in January 2004 and confirmed the methodology and data is reliable. **EAO Note**: *Since this comment was provided, the MoT undertook additional consultation and design work on options for the alignment in Lions Bay. The results are reported in the Lions Bay Clarification Report and were reviewed by the BTWG and the SEWG*	Satisfactorily addressed for the purposes of the EA review
The noise policy being used is a "guideline" in noise impact assessment only (LB)	Once MoT decides on a general design concept, it will continue to consult with the community throughout the phases of design development. **EAO Note:** *The MoT has committed to Work with the Lions Bay community to reduce current highway noise by 4 to 5 dB through mitigation measures, such as open graded asphalt and speed reduction. Further, MoT is prepared to work with the community to make best efforts to incorporate noise barriers and other noise mitigation efforts where effective, which could result in a further 5dB reduction. (OCR 9.4 and 9.5)*	No further information required for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
2. Noise		
With use of the railway bed at Brunswick Beach Rd. as a detour during the Olympics the threshold level of noise of 55dBA will be reached (Vol. 3B 8.1). Consideration that people should live with excessive noise levels at Brunswick Beach Rd. since it is `temporary" (Vol. 1, p. xxix) is unacceptable. (LB)	Once MoT decides on a general design concept, it will continue to consult with the community throughout the phases of design development. ***EAO Note**: On May 12, 2004 the MoT advised the EAO that the MoT is no longer considering the access as in the original plan which required the usage of the BC Rail grade through the Brunswick Beach homes. Two alternative options are:* ○ *Leaving the highway just to the north of Magnesia Creek Bridge and connect to the rail bed north of the Brunswick Beach homes.* ○ *Leaving the highway just to the south of M Creek Bridge*	Satisfactorily addressed for the purposes of the EA review
For queuing of traffic for scheduled night time closures, no definite mustering points have been identified. Traffic stopped for long periods of time have inherent problems, such as noise and sanitation, which must be addressed. (LB)	The MoT is developing the improvement options for the Lions Bay section of the highway. ***EAO Note**: Since this comment was provided, the MoT undertook additional consultation and design work on options for the alignment in Lions Bay. The results are reported in the Lions Bay Clarification Report and were reviewed by the BTWG and the SEWG (See also OCR 7.1 – 7.6)*	Satisfactorily addressed for the purposes of the EA review
The narrowing will produce extra noise as traffic backs up at the constriction and increased speed when drivers try to get ahead of others before the narrow road section. (LB)	***EAO Note**: Since this comment was provided, the MoT undertook additional consultation and design work on options for the alignment in Lions Bay. The results are reported in the Lions Bay Clarification Report and were reviewed by the BTWG and the SEWG*	Satisfactorily addressed for the purposes of the EA review
Noise concerns where traffic opens up to four lanes as it enters a residential area with houses close to the road. Increased speed at this point as drivers pass will increase noise issues. (LB)	***EAO Note**: Since this comment was provided, the MoT undertook additional consultation and design work on options for the alignment in Lions Bay. The results are reported in the Lions Bay Clarification Report and were reviewed by the BTWG and the SEWG*	Satisfactorily addressed for the purposes of the EA review
Proposed Detour 4 will likely have considerable congestion as traffic slows to make an unusual shift in roadway and has potential for major safety, traffic and noise issues within the Village. (LB)	The BC Rail Construction Detour is no longer under consideration	Addressed
Only the increase in noise levels due to the highway are considered when determining whether mitigation is needed. The noise generated by the existing highway is not considered. MoT mitigation guidelines apply only to freeways or expressways. The Highway 99 upgrade project is not covered by these standards. (SLFN)	***EAO Note**: Since this comment was provided, the MoT has committed to undertake additional analysis of the potential impact of highway noise within IR#24, in cooperation with the Squamish Nation, during the detailed design phase as the physical characteristics of the alignment become better known. In addition to the mitigative measures that have already been proposed (the use of open graded asphalt, traffic calming measures, etc.) the MoT will consider other viable options in consultation with the Squamish Nation. (OCR 9.7)*	Satisfactorily addressed for the purposes of the EA review
The First Nations question whether the impacts of increasing noise levels through the Highway 99 upgrade – not to mention the existing noise effects of the highway – can be considered to have low consequence, low magnitude, and not result in adverse effects. The First Nations would like MoT to examine the use of other sound-reducing mitigation on I.R. #24. (SLFN)	The MoT has committed to Undertake additional analysis of the potential impact of highway noise within IR#24, in cooperation with the Squamish Nation, during the detailed design phase as the physical characteristics of the alignment become better known. In addition to the mitigative measures that have already been proposed (the use of open graded asphalt, traffic calming measures, etc.) MoT will consider other viable options in consultation with the Squamish Nation. (OCR 9.7)	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
2. Noise		
In the socio-community section, when will MoT commit to using quieter pavement types in IR#24? Will there be a commitment to any other sound-reducing mitigation? (SLFN)	The MoT has committed to Undertake additional analysis of the potential impact of highway noise within IR#24, in cooperation with the Squamish Nation, during the detailed design phase as the physical characteristics of the alignment become better known. In addition to the mitigative measures that have already been proposed (the use of open graded asphalt, traffic calming measures, etc.) MoT will consider other viable options in consultation with the Squamish Nation. (OCR 9.7)	Satisfactorily addressed for the purposes of the EA review
Equipment and processes should be as quiet as practicable. Noise emission data and noise reduction practices should be requested from contractors during the bidding process and compared to reference data and practices described in Volume 3 Section C - Noise. Noise emission data and noise reduction practices should be requested from contractors during the bidding process. (HC)	***EAO Note**: The MoT has committed to specify in the contract documents, the procedures the Contractor is to follow to minimize noise emissions and to communicate effectively with the affected communities. The Contractor will be required to avoid or reduce construction noise at the source through the appropriate operation, modification or maintenance of construction equipment and processes. (OCR 9.3 and 9.12)*	Satisfactorily addressed for the purposes of the EA review
Periodic noise monitoring will be needed to ensure compliance with construction noise requirements. The MoT must specify what actions will result from non compliance with noise requirements (e.g.modification of equipment, procedural changes, or fines) (HC)	The MoT will include language in the construction contracts that will clearly inform the contractors of the procedures they need to follow to minimize noise emissions and to communicate effectively with the affected communities. This will include daytime and nighttime noise level objectives and this, in turn, could necessitate periodic or ongoing noise monitoring at key noise-sensitive locations.	Satisfactorily addressed for the purposes of the EA review
A plan for community consultation, communication and reaction monitoring is essential to minimize impacts. The public should be provided with as much advance notice as practicable of construction activity and expected noise levels. (HC)	***EAO Note**: The MoT has committed to meet with representatives of the various municipalities affected to identify the noisiest construction activities that must be conducted within each community and discuss the extent to which these activities can be conducted during normal daytime working hours. For activities which must be done at night, the contractor will describe the measures to be taken to minimize the noise produced and will discuss whether work can be scheduled during the first few evening hours rather than between midnight and 5:00 am. (OCR 9.2)*	Satisfactorily addressed for the purposes of the EA review
If practicable, the quietest possible type of pile driver should be employed for nighttime use near residences such as site #3 where construction noise Ldn is predicted at 86 dBA. (HC)	The Ministry of Transportation notes that there is not likely to be a great need for nighttime pile driving or rock drilling. As well; it is expected that such work could be scheduled for daytime hours when the active sites are near residential areas.	Satisfactorily addressed for the purposes of the EA review
As much as practicable, schedule the noisiest activities between 07:00 and 23:00, especially highly impulsive sources such as pile driving and rock drilling. (HC)	***EAO Note:** See above response. The MoT notes that there is not likely to be a great need for nighttime pile driving or rock drilling and expects that such work could be scheduled for daytime hours near residential areas.*	Satisfactorily addressed for the purposes of the EA review
More data is needed to better assess the long term increase in traffic noise. (HC)	Substantial additional noise monitoring recently done in Lions Bay as part of the Kelvin Grove to M Creek functional/detailed design package. Noise monitoring will be conducted in other populated areas (such as Urban Squamish) where project-related traffic noise impacts have been projected to approach Ministry of Transportation policy mitigation thresholds. ***EAO Note**: Since this comment was provided, the MoT undertook additional consultation and design work on options for the alignment in Lions Bay. The results are reported in the Lions Bay Clarification Report and were reviewed by the BTWG and the SEWG*	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
2. Noise		
Sensitive sites such as the day care facility, school and IR #24 require more attention to determine the extent of mitigation needed. (HC)	There is one daycare located close to the project corridor at the Totem Hall on the Squamish First Nation's IR #24 in Squamish. Since Totem Hall was one of the sites included in the April 2003 baseline noise monitoring program on IR #24, the current noise environment there is known to be high - Leq(24) 69.7 dBA including BC Rail noise events and about 64 dBA due to highway traffic alone. **EAO Note:** *Since this response was provided the MoT has committed to assess, monitor and, if necessary, mitigate construction noise exposures at the Eagle Ridge School and the Stawamus Elementary School and will , as part of the Noise Control and Mitigation Plan, determine the layout, nature and schedules of any affected daycare facilities, including the facilities at Lions Bay and on the Squamish First Nation's IR #24, to develop strategies that will limit project-related construction noise exposures during nap times. (OCR 9.9 and 9.10)*	Satisfactorily addressed for the purposes of the EA review
Clarify whether any rural areas are affected. (HC)	No residential locations are very near the project corridor which have exceptionally low baseline noise levels. West of and below the highway elevation, baseline noise levels can, however, be moderately low (less than 50 dBA) due to the shielding effect provided by the highway shoulder. Since both highway construction and operation noise impacts have been based on project-related increases in daily average noise levels over measured baseline levels, the increased sensitivity of areas with low baseline noise levels has been taken into account.	Satisfactorily addressed for the purposes of the EA review
Notification of the communities using flyers, followed by consultation, will be essential to minimize impacts. For example, informing people of construction scheduling may allow them to avoid excessive noise exposure. (HC)	**EAO Note:** *Point of Information*	No further information required for the purposes of the EA review
A complaint phone line will be needed to respond to the community. (HC)	All of these general approaches to avoiding and mitigating construction noise impacts were identified in Volume 3, Section C, Sub-section 7.1 of the Application. It is Ministry of Transportation procedure to establish an info/complaints line for major projects such as Sea-to-Sky. **EAO Note**: *Point of Information*	No further information required for the purposes of the EA review
The number of people in each of the noise-exposed areas is required to evaluate impacts. (HC)	**EAO Note**: *The MoT provided additional information to Health Canada on February 26, 2004 in response to Health Canada's interest in calculations using the "% Highly Annoyed" approach to estimate construction noise impacts.*	Satisfactorily addressed for the purposes of the EA review
For schools the WHO Guidelines and Province of Alberta *Standards and Guidelines for School Facilities* (Alberta Infrastructure 2001) state a recommended limit level indoors of 35 dBA. This level depends on the acoustical properties of the classroom.	**EAO Note:** *The MoT has committed to and Noise Control and Mitigation Plan and to assess, monitor and, if necessary, mitigate construction noise exposures at the Eagle Ridge School and the Stawamus Elementary School. (OCR 1.2 and 9.9)*	Satisfactorily addressed for the purposes of the EA review
Provide an explicit statement that there are no hospitals or seniors residences, or, if there are, provide impact assessment.	There are no known seniors' residences in close proximity to the STS alignment, however this will be confirmed during the detailed design phase of the Urban Squamish section. If any such facilities should exist, they will be treated as residential properties.	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
3. TDM (Transportation Demand Management)		
EAO Note *Recommended TDM measures, other than bicycle lanes on the highway shoulders, require the participation of many jurisdictions, are beyond the sole authority and control of the MoT and are beyond the scope of the environmental assessment for this Project. The MoT has committed to participate in future multi-jurisdictional discussions towards delivery of other TDM measures if a forum is assembled. TDM is discussed in the Assessment Report.*		
There is no funding consideration for sponsoring much needed transit and ferry services. Transit and ferry will improve access, mobility, and safety of the highway, and assist with meeting the project goals. (Mayors)	Study by TSi shows the corridor has relatively high bus ridership and low single occupant vehicle travel. Improvements to these alternatives do not preclude the need to make safety, reliability and mobility improvements to the highway. Provision of rail, and ferry services are generally the responsibility of regional transportation authorities and agencies responsible for ferry and rail service. The MoT does not have the authority or responsibility to provide these services.	No further information required for the purposes of the EA review
Commit to improving the livability and air quality of the corridor through implementing Transportation Demand Management measures. This would include facilitate a regional transit system (Whistler to Squamish, Squamish to the GVRD) and ferry service (GVRD to Squamish) component. (Mayors)	The MoT has lead a demand management study through the TLC represented by all the corridors communities. The MoT does not have authority or responsibility over transit, ferries, rail and land use but is committed to working with the organizations and agencies responsible to ensure that the highway improvements are integrated with other service improvements.	No further information required for the purposes of the EA review
Consideration needs to be given to bus terminals, park&ride facilities and connecting links to modes such as passenger rail and ferry services. (DoS)	TSi has recently completed a Transportation Demand Management report for the Sea to Sky Highway corridor. The project team will work with the local governments and responsible agencies as much as possible to facilitate the recommendations of the report.	No further information required for the purposes of the EA review
Include an analysis of the benefits of TDM initiatives to improve transportation movements, community growth, and public health. Consider : ○ A Sea-to-Sky commuter and visitor transit service with potential links to Vancouver airport, Squamish and Whistler. ○ Bus or transit priority lanes between areas of strong commuter traffic demand such as Lions Bay/Squamish and Lower Mainland. ○ Park&ride lots in Vancouver, North/West Vancouver, Squamish, and Whistler linked with ridesharing and carpooling programs already developing with the Jack Bell Foundation. (RMOW)	The MoT led a TDM study with the TLC. The MoT is committed to working with the organizations and agencies responsible to ensure that Sea-to-Sky highway improvements are integrated with other service improvements. With regard to public health, the MoT wanted to first analyze the air quality impact assessment results before embarking on a public health impact assessment. An air quality impact assessment concluded overall project impacts on air quality would be positive, neutral or, worst case, low, compared to the baseline. The VCHA required no further assessment of public health impacts from incremental changes. Health Canada deferred to the views of the VCHA.	No further information required for the purposes of the EA review
Sea-to-Sky Highway Improvements are necessary and applauded, however more focus should be placed on developing transportation alternatives to the automobile throughout the corridor. Squamish should be a hub in the integrated transportation plan. ○ Bus Transportation ○ Inter-Community Transit ○ Van Pool ○ Tourist Rail and Passenger Service ○ Regional Airport (Pemberton) ○ Marine Facilities (Vancouver to Squamish) (ELD)	A number of studies have been undertaken over the last few years. Other transportation modes examined include commuter ferry, commuter rail, higher speed commuter rail and transit. The studies generally conclude that the various options would not divert sufficient ridership from the automobile to negate the need for the highway improvements. Improved bus service showed the highest potential to capture ridership. The objective of the recent TSi study is to develop a strategy that will lead to more effective utilization of the Sea to Sky Highway by encouraging multi-occupant vehicle usage for inter-regional travel. This study will be shared with local governments and the communities when it is finalized.	No further information required for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
3. TDM (Transportation Demand Management)		
EAO Note *Recommended TDM measures, other than bicycle lanes on the highway shoulders, require the participation of many jurisdictions, are beyond the sole authority and control of the MoT and are beyond the scope of the environmental assessment for this Project. The MoT has committed to participate in future multi-jurisdictional discussions towards delivery of other TDM measures if a forum is assembled. TDM is discussed in the Assessment Report.*		
The District of Squamish has expressed its interest in having the ferry terminal located at the southernmost tip of the estuary and just south of the downtown. (ELD)	The commuter ferry terminal and links to the existing highway are not part of the current project scope. This is part of the Olympic Transportation Plan which will involve the MoT, but timelines for this are unknown at this time.	No further information required for the purposes of the EA review
TSi identified the ferry as a strong transportation option from Squamish to downtown Vancouver. Given the expected cost efficiencies and ease of implementation, a ferry system from Squamish to Vancouver with stops at Britannia and Lion's Bay may be a strong transportation choice. (RMOW)	MoT is committed to working with the organizations and agencies responsible to ensure that Sea-to-Sky highway improvements are integrated with other service improvements.	No further information required for the purposes of the EA review
The socio-economic report does not detail how the highway upgrades will support or conflict with Whistler's and Vancouver's transportation plans. No discussion on the already congested Taylor Way and Lion's Gate Bridge, and the potential impacts to Whistler's guest experience from further increased congestion from the tourists point of entry (i.e. the airport) through Vancouver and within Whistler. (RMOW)	The MoT led a TDM study with the Technical Liaison Committee which represents all the corridor communities. The product is the recently completed Sea-to-Sky TDM Study by TSi Consultants. MoT is committed to working with the organizations and agencies responsible to ensure that Sea-to-Sky highway improvements are integrated with other service improvements.	No further information required for the purposes of the EA review
An integrated, sustainable regional transportation strategy for the corridor should be developed and implemented. More focus should be placed on developing transportation alternatives to the automobile throughout the corridor. Transportation modes must be integrated. (ELD)	***EAO Note:*** *This issue is beyond the scope of the EA review*	No further information required for the purposes of the EA review
The MoT should not assume that the development cap will be lifted and Whistler will be able to support a permanent population of 18,981 persons by 2025. To provide a better forecast, we ask the MOT use the RMOW's Planning Department's estimates of 12,448 permanent residents at the development cap. (RMOW)	***EAO Note:*** *Point of information*	No further information required for the purposes of the EA review
How will the proposed highway upgrades complement Whistler's and the Lower Mainland's transportation plans? (RMOW)	MoT is committed to working with the organizations and agencies responsible to ensure that Sea-to-Sky highway improvements are integrated with other service improvements.	No further information required for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
4. Land Use		
Need for a more comprehensive review of population projection inputs and impacts to be completed including extending the study area to Pemberton/Mount Currie. Key factors required for the assessment include a calculation of the total population allowed by current zoning in Squamish, Whistler, Pemberton and Mount Currie. A similar assessment of impacts is required regarding the total number of annual visitor days that will be supported by present and future developments in the corridor. (TWFN)	This level of analysis is beyond the scope of potential project related impacts ad the associated EA review process. MoT has initiated discussions with the Lil'wat Nation related to a range of issues in the Pemberton/Mt. Currie area.	No further information required as part of the EA review
Access to land, particularly hunting and gathering areas and sacred sites, is important to the Squamish Nation and Lil'wat Nation. Direct discussions must be held with the First Nations to identify ways in which access changes could affect their interests and to determine appropriate mitigation. (SLFN)	Specific access issues have also been raised by the Squamish Nation within the context of their AIUS discussions and related discussions are ongoing. It is also anticipated that the Squamish Nation will have specific access issues related to the highway alignment through IR#24 and the MoT has committed to addressing these in cooperation with the Nation.	No further information required as part of the EA review
Discussion and analysis of project impacts on SLRD electoral areas is virtually non-existent. (SLRD)	The Socio-Community Economic Assessment relied heavily on federal, provincial and local data sources for statistics such as population, economic activity and other matters, which are generally available at the municipal level but not for the unincorporated areas. The general impacts (positive/negative) of construction and operation of Highway on Electoral Areas C and D would be similar to those described for the Study Area as a whole. Effects are captured in the overall population forecasts and reflected in impacts such as traffic volume increases and increased demand for schools, hospitals, emergency and community services.	Satisfactorily addressed for the purposes of the EA review
No reference to the Area D or Area C OCPs, or the Howe Sound East Sub Area Plan. (SLRD)	Recognized that Electoral Areas C (surrounding Pemberton) and D (Howe Sound East) have resident populations and potential for future development. Relied on forecasts in *Sea to Sky Land and Resource Management Plan* and population projections developed by the provincial government. General impacts (positive and negative) of construction and operation of the project on Electoral Areas C and D would be similar to those described in the report for the Study Area as a whole.	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
5. Connectivity		
Improvements are required in addition to the Sea-to-Sky Highway to improve connectivity to US border crossings, YVR and other major access routes. This will reduce overall drive times to Whistler. (ELD)	***EAO Note***: *Point of Information. Beyond the scope of the EA review*	No further information required as part of the EA review
Application deals only with crossings at three major intersections in Lions Bay and eight in urban Squamish. The effect of median barriers on people and vehicles wishing to cross the highway at locations other than intersections is not discussed. The effect of higher traffic volumes and speeds on pedestrian crossings also is not discussed. (SLFN)	The MoT team will continue to identify and discuss potential barrier related issues with the corridor communities, through the TLC and CAGs, and will develop solutions to mitigate potential impacts. Where this is a specific issue related to highway alignment through IR#24, the commits to work closely with Squamish First Nation to identify and mitigate potential impacts related to intra-community barriers within IR#24. (See also OCR 18.3)	Satisfactorily addressed for the purposes of the EA review
Increased volumes and speeds of traffic will not contribute to the safety or pleasantness of the highway for cyclists or pedestrians. Lil'wat Nation has concerns about safety for non-motorized travelers near Mt. Currie. (SLFN)	The MoT estimates that the incremental traffic north of Whistler is not expected to have a significant safety impact to non-motorized travelers in the Mount Currie area.	No further information required as part of the EA review
Section on community access could be integrated with Section 9.8, Intra-Community Travel, because both sections deal with barriers, changes in access, and safety. (SLFN)	***EAO Note***: *Point of Information*	
The report should note that the barrier effect of the highway is increased when roads are widened, accommodate greater traffic volumes, encourage higher vehicular speeds, and feature installation of median structures. Classifying the magnitude, extent, and significance of the barrier effect warrants discussion and assessment in the EA. (SLFN)	The MoT team will continue to identify and discuss potential barrier related issues with the corridor communities, through the TLC and CAGs, and will develop solutions to mitigate potential impacts. Where this is a specific issue related to highway alignment through IR#24, the commits to work closely with Squamish First Nation to identify and mitigate potential impacts related to intra-community barriers within IR#24. (See also OCR 18.3)	Satisfactorily addressed for the purposes of the EA review
Unclear whether the statistics on reduced accident rates include pedestrian and cyclist facilities or just motor vehicles. What will the effect be of greater traffic volumes in Lil'wat territory north of Function Junction, and particularly in the Pemberton Valley, where the highway will not be upgraded but will carry more traffic? (SLFN)	Accident statistics and estimates were not included for the area north of Function Junction, since these areas are outside the scope of work for highway improvements. The EA Application estimated that latent demand and additional population generated by the STS Highway improvements will result in a traffic increase of approximately 7.5 percent relative to the Base Case in the absence of the Project. This will add approximately 600 vehicles per day to the current average annual daily traffic (AADT) of 7,700 between Squamish and Whistler. If 20% of the induced traffic travels beyond Whistler and through Mount Currie, this will amount to an additional 120 vehicles per day or an additional 10 to 15 vehicles during the peak hour. The MOT used data from the Insurance Corporation of British Columbia to determine accident rates. The statistics used included all accidents involving vehicles, pedestrians and cyclists.	No further information required for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
6. **Aesthetics**		
Existing viewpoints should be enhanced and additional viewpoints developed. Opportunity to access natural attractions such as Murrin, Shannon Falls, Squamish Chief, Garibaldi Provincial Park and Alice Lake should be considered in the design of highway upgrades. A premium should be placed on aesthetics when considering elements such as street furniture, landscaping and signage. (DoS)	The MoT is currently selecting a design consultant for the urban Squamish section of the highway improvements. The District's objectives were captured in the Terms of Reference for this assignment and CSD guidelines will be used in the design development. The Project team will work closely with the District to ensure these objectives are addressed in the processes. ***EAO Note:*** *Since this response was provided the MoT has committed to commission a landscape design consultant to work closely with the District of Squamish on the urban Squamish section of the highway improvements, and with the Squamish Nation on Stawamus IR#24. The MoT has also committed to develop and implement detailed mitigative measures, in association with BC Parks, to minimize potential impact to recreation features and amenities at Porteau Cove Provincial Park, Murrin Provincial Park, Shannon Falls Provincial Park and Brandywine Falls Provincial Park. (OCR 11.5 and 15.7)*	Satisfactorily addressed for the purposes of the EA review
Squamish is a world renowned destination particularly for rock climbing and wind surfing. Important that these unique resources be fully understood in the design process and that the highway project enhance their exposure and usage. Safe access and ample parking for the Murrin, Malamute and Chief venues should be a design priority. (DoS)	***EAO Note**: The MoT has committed to Conduct further visual quality assessment as required to refine the list of important landscape features and to determine precisely how and if their use should be promoted.* (OCR 15.2) (See also above response.)	Satisfactorily addressed for the purposes of the EA review
The EA contains no description of the highway's impacts on the aesthetics of the corridor. Considering the substantial amount of blasting, bridging, and landscape alteration that will accompany the Highway 99 upgrade, this seems to be a substantial omission. The First Nations consider the aesthetics section to be incomplete. (SLFN)	The Application did not describe potential highway impact on the aesthetics of the corridor since design work was ongoing. A Context Sensitive Design document was prepared especially for this corridor and this approach took into account "the preservation of aesthetic resources". The document was developed using the principles of the MoT's *Manual of Aesthetic Design Practice*. There will be a very conscientious level of aesthetic treatment on this highway." ***EAO Note**: Since then, the MoT has committed to conduct further visual quality assessment as required to refine the list of important landscape features and to determine precisely how and if their use should be promoted. (OCR 15.2)*	No further information required as part of the EA review
7. Recreation		
EA addresses "industrial tourism" or moving masses of people through an area, encouraging maximum expenditures, and sending them on their way. Unclear how Squamish Nation would benefit from increased number of skiers, golfers, snowmobile users, day-trippers, and other industrial tourists in the corridor. Tourism impacts on the Lil'wat Nation not discussed in Application. (SLFN)	To the extent that impacts on First Nations interests were to be identified, the MoT felt that these issues were more appropriately addressed within the context of the First Nations AIU Studies. Related issues have been identified in these reports and are currently under discussion between the First Nations and government.	No further information required as part of the EA review
To the extent that the Highway 99 upgrade encourages further recreational and industrial tourist use of the First Nations' traditional territory, First Nations consider these impacts significant and adverse. The recreation section lacks any reference to First Nations. (SLFN)	The recreation section is focused on recreational users generally. To the extent that impacts on First Nations interests were to be identified, the MoT felt that these issues were more appropriately addressed within the context of the First Nations AIUS. Related issues have been identified in these reports and are currently under discussion between the First Nations and government.	No further information required as part of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
7. Recreation		
There may be significant impacts on the recreational experience in the park. Residual adverse impacts on rock climbs could be avoided by altering the highway design so that blasting to accommodate three (or four) lanes would not be needed in the vicinity of Murrin Park. Did MoT consider eliminating the northbound left turn lane into the park during the Olympics to accommodate three lanes? (SLFN)	The MoT recognizes the recreation value of Browning Lake and the rock bluffs within Murrin Park. A recreational focus group has recently been established to exchange information, identify all recreation values along the corridor and develop solutions to enhance recreation values where feasible and mitigate impacts where unavoidable. These discussions are ongoing and will continue through to detailed design with the goal of minimizing impacts to the Murrin Park to the fullest extent possible. **EAO Note:** *The MoT has also committed to develop and implement detailed mitigative measures, in association with BC Parks, to minimize potential impact to recreation features and amenities at Porteau Cove Provincial Park, Murrin Provincial Park, Shannon Falls Provincial Park and Brandywine Falls Provincial Park.* (OCR 11.5)	Satisfactorily addressed for the purposes of the EA review
A clear commitment by MoT to conduct the recommended mitigation of impacts to upland recreation would be desirable, and should be contained in the recreation section itself. (SLFN)	An iterative design and review process serves to explore options to avoid impacts as a first goal, then to mitigate impacts as needed. The MoT is consulting further with BC Parks and other recreation stakeholders to address specific areas of concern as continuing design work provides more detailed information on possible options for impact avoidance and mitigation. Clear commitments will flow from these consultations. ***EAO Note:*** *See also above response.*	Satisfactorily addressed for the purposes of the EA review
Roadside (e.g., Shannon Falls), Front Country (Murrin Park), and backcountry areas (such as Garibaldi Lake) already face serious overuse and crowding problems during the summer season. The Application fails to examine the compounding affects of increased traffic and development on the (a) quality of the recreational experience, (b) the carrying capacity of these parks, or (c) ecological effects of overuse of the parks. Increased backcountry and frontcountry recreational use is a concern to the First Nations. (SLFN)	MoT's viewpoint is that these issues fall outside the scope of this review. The Upland Recreation Assessment does not address the potential impact of recreation activity on other values (e.g. ecological values, other land uses), nor does it discuss the associated concept of "carrying capacity". The study is focused on highway improvement-related effects on recreation values. **EAO Note:** *The MoT has also committed to develop and implement detailed mitigative measures, in association with BC Parks, to minimize potential impact to recreation features and amenities at Porteau Cove Provincial Park, Murrin Provincial Park, Shannon Falls Provincial Park and Brandywine Falls Provincial Park. (OCR 11.5)*	Satisfactorily addressed for the purposes of the EA review
The report should include the results of discussions between the MoT, BC Parks and private recreational groups regarding mitigation for impacts on Porteau Cove Provincial Park, Murrin Provincial Park, Shannon Falls Provincial Park, and Brandywine Falls Provincial Park and a commitment by the MoT to implement such mitigation measures. (SLFN)	Discussions have not yet concluded. Three meetings were held in the past nine weeks. Site-specific concerns can now be discussed with greater resolution given continuing design work and exchange of information with BC Parks. For example, encroachment on the Cypress Provincial Park boundary will be avoided at one location where there was previously an encroachment. The MoT also has initiated a direct consultation process with recreation stakeholder groups. MoT and BC Parks will be finalizing a letter of agreement on park issues and mitigation in December 2003. ***EAO Note**: Since this comment was provided, the MoT has committed to continue to consult with recreation industry and user representatives about issues that affect their interests, and ensure that, whenever feasible, adverse impacts are avoided or mitigated. (OCR 11.1)*	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
7. Recreation		
The possible impacts the proposed project will have on back-country recreation demand including an assessment of increased pressure that the higher corridor population will place on use of back-country areas that are currently stewarded by the TWFN. (TWFN)	This level of analysis is beyond the scope of potential project related impacts and the associated EA review process. Project related issues have been assessed in the Upland Recreation Assessment contained within the EA Application.	No further information required as part of the EA review
Commitment to mitigative measures to control potential for increased number of people living in the Squamish area accessing privately held TWFN land in the Indian River valley. Proposed measures include gating access to the Indian River valley, and provision of funding for patrolling sensitive cultural and fish habitat areas (TWFN)	It is not clear to the MoT how the proposed project will result in increased access or damage to the above noted areas. As such, MoT is of the view that the requested measures are related to impacts beyond the scope of the proposed highway upgrade. However, the MoT is willing to discuss this issue in more detail with the Tsleil-Waututh First Nation to better determine the need for, and appropriateness of the requested measures.	No further information required as part of the EA review
8. Economic		
The Application does not provide information on the economic impacts to visitor and tourist spending from the operations phase of the highway and states that highway upgrades could affect the quality of the resort experience and that "this issue is beyond the ability of the MOT to mitigate" (page 137). Should analyze the potential benefits of the improved highway access to Whistler and compare with potential negative impacts on traffic congestion in the Village and loss of tourism from overcrowding. (RMOW)	The implied concern with the observation in the draft report was that "congestion could affect the quality of the resort experience" and that "This is an issue that is beyond the ability of the Ministry of Transportation to mitigate." The Application was revised to acknowledge that means of dealing with congestion and traffic volume increase will be addressed through the ongoing Whistler Resort Transportation Planning Study being undertaken jointly by the Resort Municipality of Whistler and MoT. This transportation planning study will further define how the transportation infrastructure will help to achieve community growth objectives.	No further information required for the purposes of the EA review
The economy and labour force sections of the assessment say nothing about conditions on First Nations reserves or about First Nations people. (SLFN)	It was felt that this information would be provided within the AIUS reports and would be more appropriately reflected therein.	No further information required for the purposes of the EA review
Project construction expected to generate $183 million in government revenues. The EA does not discuss what proportion of these revenues, if any, would or could flow to First Nations. (SLFN)	The MoT is of the view that the environmental assessment Application is not the appropriate forum to address such issues. The MoT suggests that First Nations raise this issue in other forums as appropriate.	No further information required for the purposes of the EA review
The EA lacks a statement of MoT procurement policy and procedures. The First Nations would like a specific commitment to jobs and economic benefit from highway construction. (SLFN)	MoT is of the view that the EA Application is not the appropriate venue to discuss any such commitments. Discussions related to possible economic opportunities associated with construction of the highway are underway and will continue within the context of the First Nations AIUS submissions.	No further information required for the purposes of the EA review
No mention is made of First Nations and their aspiration to be involved in direct award or similar participation in the construction of proposed project route. (TWFN)	An EA Application is not the appropriate venue to discuss potential details of this nature. The interests of the Tsleil-Waututh First Nation in this aspect of the project are mentioned on numerous occasions within the First Nations Consultation section of the Application.	No further information required as part of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
8. Economic		
The impacts of population growth, its location, demand for housing, services, jobs, resources, are not examined, even though the study presents the increase as an induced impact of the highway upgrade. (SLFN)		No further information required as part of the EA review
The project will put upward pressure on already high land and cost-of-living values in the corridor. An assessment is required of impacts this growth will have on access aboriginal people will have to housing, employment and other services in the corridor. (TWFN)	This level of analysis is beyond the scope of potential project related impacts and the associated EA review process.	No further information required as part of the EA review
How much of predicted $297 million in increased economic activity between 2010 - 2025 might accrue to the First Nations? (SLFN)	***EAO Note**: This issue has been resolved through accommodation discussions.*	No further information required as part of the EA review
The basis for statements about potentially significant and positive impact on the Sea-to-Sky University, Garibaldi Resort, and the 2010 Olympic Winter Games is not explained. Without an accommodation or other agreement with the First Nations for these other developments it is inappropriate to impacts "positive" for First Nations. (SLFN)	*EAO Note: Point of Information*	
Concerns about impact of highway construction on the local economy. A comprehensive and open consultation process should be undertaken well in advance of commencing major construction projects. (DoS)	The MOT design requirements include development of concepts that minimize traffic impacts during construction. Project team will consult with the communities to better understand the impacts and develop strategies that mitigate these impacts to the extent possible. Project team will also develop an effective communications plan to keep the public fully apprised of closures and delays. ***EAO Note**: Since this comment was provided, the MoT committed to develop and implement a pro-active overall communications strategy to coordinate construction work, communications and stakeholder dialogue. This will include liaison with First Nations, municipalities, businesses, Chambers of Commerce, and tourism associations about schedules for construction and special events and working with businesses to examine adjustments to work schedules during closure periods. (OCR 7.5)*	Satisfactorily addressed for the purposes of the EA review
Negative impact of closures and delays to workforce, tourism and economy. This concern includes multiple delays and/or closures. (ELD)	The RMOW is currently undertaking a joint planning study with the MoT to identify transportation improvements within the urban area. The municipality certainly strongly support travel demand management and alternate modes of travel. (See also above response)	Satisfactorily addressed for the purposes of the EA review
Increasing development in auto-dependent bedroom communities, where residents must drive long distances to and from work every day is inconsistent with the vision, policies, and goals of the Livable Region Strategic Plan adopted by the GVRD and all of its member municipalities, and of the Squamish Nation's Xay Temixw (Sacred Land) – Land Use Plan and the Lil'wat Cultural, Heritage, Resource, Protection Plan. (SLFN)	***EAO Note**: Point of Information*	No further information required as part of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
9. Surplus Rock		
It has been suggested that ocean disposal of surplus rock is being contemplated. The District may have a number of uses for this rock as an option to ocean disposal. (DoS)	*EAO Note: Point of Information*	No further information required as part of the EA review
The First Nations have expressed an interest in obtaining surplus rock for a variety of uses in their territories, and request a right of first refusal for all surplus rock. (SLFN)	***EAO Note:*** *This concern was assigned to accommodation negotiations.*	No further information required as part of the EA review
10. Property Tenure		
This brief section of the report notes that MoT is ˋassembling, quantifying and qualifying all of the property tenure documents for the Highway 99 corridor˜ (page 1). No impact assessment findings are presented in this section, nor are any mitigation measures stated. (SLFN)	***EAO Note****: The reporting in the Application on Property tenure is satisfactory.*	No further information required as part of the EA review
11. Property Acquisition Process		
The MoT should not assume that the Squamish Nation will provide approval of the highway crossing of IR#24 under the First Nation Land Management Act land code. (SLFN)	The MoT is committed to working cooperatively with the Squamish Nation, and other government agencies as appropriate, to arrive at a timely and mutually satisfactory resolution to the right-of-way through IR#24.	No further information required as part of the EA review
12. Archaeological Issues		
The First Nations would be interested in obtaining any culturally modified trees that need to be cleared. The trees could be used for ceremonial and traditional construction purposes.	This issue has been raised within the context of the AIUS and related discussions are ongoing. ***EAO Note:*** *This concern was assigned to accommodation negotiations.* (See also Nations OCR 12.4 and 12.8)	No further information required as part of the EA review
The Ministry commits to ˋdevelop measures to minimize vandalism˜ where the highway provides improved access to known archaeological or historical sites. The First Nations would like to know what kinds of measures might be available, feasible, and acceptable to the Ministry. The MoT does not commit in this section to narrow the road right-of-way through Murrin Provincial Park to reduce blasting impacts on the slopes to the east of the highway. (SLFN)	The commitment in the Application reads ˋa where highway widening provides improved access to a site of known archaeological or historical significance, working cooperatively with the First Nation(s) that have an interest in the site, as well as the responsible government agencies, to develop measures to minimize vandalism˜. Issue of protecting known sites has been raised in the context of the AIUS. The MoT has committed to further exploring options/opportunities to protect these sites from potential project related impacts. ***EAO Note:*** *Since this comment was provided the MoT has committed that where highway widening provides improved access to a site of known archaeological or historical significance, the MoT will work cooperatively with the First Nation(s) that have an interest in the site, as well as the responsible government agencies, to develop measures to minimize impacts related to over use and/or vandalism. The MoT will also facilitate discussion between the Province and the First Nations to identify steps that can be taken by BC Parks to protect the pictograph site in Murrin Provincial Park from impacts from rock climbing and vandalism. (OCR 12.3 and 12.5)*	Satisfactorily addressed for the purposes of the EA review

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
12. Archaeological Issues		
The TWFN has prepared an independent assessment of impacts of project on cultural heritage resources titled 'A Cultural Heritage Resource Study of the Sea-to-Sky Highway Corridor. The TWFN would like the Ministry to make a commitment of funding to implement the findings reported on page 67-68 of this study. (TWFN)	Based on a review of 'A Cultural Heritage Resource Study of the Sea-to-Shy Highway Corridor", the MoT is of the view that the proposed project will have little bearing on the majority of the issues raised. However, MoT is willing to further discuss the Report's recommendations to determine whether there are appropriate means by which to address the issues raised.	No further information required as part of the EA review
13. Process Issues		
The EA has focused on the direct impact of the highway, and included indirect and induced benefits, but it has not included indirect and induced development impacts and their potential negative effect on the First Nations, the environment, utilities, services, and the livability of the Sea-to-Sky corridor. (SLFN)	***EAO Note:*** *This issue is beyond the scope of the EA review. Regarding induced Project effects and the cumulative effects assessment, the Canadian Environmental Assessment Agency wrote to the SLFN on January 20, 2004 to advise that CEAA does not require assessment of induced growth unless the type of projects, the area of impact and the environmental components that would be affected could reasonably be identified and are likely to interact with the Project.*	No further information required as part of the EA review
Commit that public consultation with the Sea-to-Sky communities will continue as each stage of the project is permitted. (Mayors)	The MoT is committed to ongoing consultations with residents, businesses, tourism sector and corridor communities at key milestones throughout the project.	No further information required as part of the EA review
With compressed project timelines the processes for public and stakeholder consultation on substantive issues have not moved forward with a similar level of urgency. (DoS)	***EAO Note****: Point of Information.*	No further information required as part of the EA review
The project submission for Environmental Assessment Certification is little changed from the initial concept proposed by the Project Team. (West Van)	Preferred option is a couplet operation with a short (1.0 km to 1.4 km in length) tunnel for northbound Highway 99 traffic, and existing Highway 99 for southbound traffic. Preliminary design has northbound lanes converging with existing highway near Pasco Road, provides opportunity for direct northbound opportunities to Pasco Road residents and avoids encroaching on Cyprus Provincial Park. This option was not included in the Application, but the MoT has provided this information to the District. **EAO Note***: Since this comment was provided, the MoT undertook additional consultation and design work on options for the alignment in West Vancouver. The results are reported in the West Vancouver Clarification Report and were reviewed by the BTWG and the SEWG.*	No further information required as part of the EA review
It is unacceptable to have an agency of the BC government agency (BC EAO) assessing a project of BC MoT. The potential for conflict of interest is too high, especially with an EA Act that is open at several levels to Ministerial political intervention. Until the EA Act is revised to create independent project review panels the EA process in BC will remain fundamentally flawed. (TWFN)	**EAO Note***: Under the EA Act, the EAO is responsible to establish the scope procedure and methods for an environmental assessment. During an environmental review, the EAO relies on technical advice from working groups to assess the impacts of a proposed development. The EAO does not decide whether to issue an environmental assessment certificate. This decision is made by provincial ministers.*	N/A

COMMENT/ ISSUE	MINISTRY OF TRANSPORTATION RESPONSE	EA STATUS
13. Process Issues		
Issues around Aboriginal Title and the need to provide information on the impacts that the Ministry considered the project will have on aboriginal title, as well as an outline of possible revenue sharing strategies that might be associated with the project that would compensate the TWFN for damage to present and proposed highway route has caused to TWFN traditional lands. (TWFN)	In preparing the Application, the MoT and the EAO have met the *Provincial Policy for Consultation with First Nations* (2002) as well as the EAO Guidelines regarding First Nation consultation.	No further information required as part of the EA review
14. Other		
The report states that "there are two First Nation communities located in the study area, Squamish IR Stawamus #24, which is in closest proximity to the highway, and Lil'wat (or Mt. Currie)." This statement ignores the other Squamish Nation reserves located in the Highway 99 corridor. Later in the report, however, Section 2.3.2 notes that "there are nine First Nation reserves located within the District of Squamish." The report further states that "these reserves represent approximately four percent of the municipality's land area" (page 15), even though the reserves are not part of the District of Squamish. (SLFN)	***EAO Note**: Point of Information. This error is not repeated in subsequent reporting and is noted in the SEWG minutes of February 12, 2004*	No further information required as part of the EA review
Any future applications submitted within the BC *Environmental Assessment Act* process that are located within TWFN traditional territory include proposals for a significant level of economic participation by the TWFN. (TWFN)	***EAO Note**: The environmental assessment process includes opportunities for any First Nations with asserted traditional territory in the vicinity of a project to participate in the environmental assessment review.*	No further information required as part of the EA review

SEA-TO-SKY HIGHWAY IMPROVEMENT PROJECT ASSESSMENT REPORT

APPENDIX 2

SUMMARY OF PUBLIC COMMENTS AND MINISTRY OF TRANSPORTATION RESPONSES

This document summarizes public comments received on the Application and the responses provided by the MoT. The comments tracked in this document were submitted between August 20, 2003 and October 17, 2003 during the public comment period conducted by the EAO. A summary of the public comment process and the issues identified is presented in Section 7 of the Sea-to-Sky Highway Improvement Project Assessment Report.

The MoT responses were issued in 2003 prior to the additional consultations held by the MOT with the Village of Lions Bay and the District of West Vancouver and the issuance of the *Sea-to-Sky Highway Improvement Project, Clarification Report, Village of Lions Bay* (March 2004) and the *Sea-to-Sky Highway Improvement Project Clarification Report – Horseshoe Bay to Sunset Beach (West Vancouver Segment)* (April 2004).

Comment/ Issue	Ministry of Transportation Response
VANCOUVER AREA	
J. Siu. Supports BEST policy positions and strongly opposes highway expansion. Need transport demand management measures and alternative modes of transport rather than increased highway capacity. Would help reduce Greenhouse Gases	Primary objectives of project are to improve safety and reliability, with capacity improvements where needed. MoT is supportive of traffic demand measures and is undertaking a Traffic Demand Management study. BC Rail committed to operating rail shuttle service between Whistler and the Callaghan Valley venue during Olympics. Section of BC Rail corridor that will be used for a southbound lane will still facilitate joint use by vehicles and rail.
Kahla Lichti. Investigate a commuter train option instead of highway improvements.	Commuter rail was considered and analyzed in corridor studies undertaken over the last few years Generally, studies conclude commuter rail is expensive, would only divert a small percentage of ridership off highway, and wouldn't eliminate current requirements to improve highway.
Robert Baxter. Most sensible, sustainable and possibly economical plan would be to introduce frequent passenger service on the existing rail line rather than increase highway traffic.	Primary objectives are to improve safety, reliability and provide additional capacity where needed. Commuter rail was considered and analyzed and is expensive and would only divert a small percentage of ridership off the highway. Improved transit service was identified with highest potential to divert ridership. Project team will work with various agencies responsible for implementation of TDM measures.
K Webster – Prefer train route to Whistler and upgrade of BCR Line.	***EAO Note:****(See above responses).*
David Pritchard. Scope of Transportation Demand Management Study did not consider how tolls could potentially increase transit ridership and vehicle occupancy.	General government position is tolls only implemented when a toll-free alternative route is available. TSi Consultants are currently undertaking a Travel Demand Management Study. Improvements are urgently required to address highway safety.
Cynthia van Ginkel. Take measures to reduce unnecessary vehicular idling during construction and maintenance of the Sea-to-Sky Highway works	May be easier to implement with contractors rather than general public. Contractors will generally operate in most cost-effective manner, which would include shutting down equipment when not in use. Not aware of any regulatory requirements for public turning off engines while waiting in traffic queues.
Laura Rosenthal and Robert M. Schertzer. Better lighting along the medians to improve night visibility and safety. Impressed with progress on Culliton Creek to Cheakamus Canyon construction and the minimal highway closures.	Objective is to improve safety along the corridor. Lighting and delineation will be improved. Generally overhead lighting is provided at intersections, interchanges and within urban areas. Various types of delineation are used to define lane lines, fog lines, shoulder lines, concrete barriers etc.
Dr. M. Kaburda. Address potential environmental geotechnical hazards in the Garibaldi Civil Defence Zone and at the Daisy Lake Dam before allowing improvement of the highway because of the risk to public safety.	Rubble Creek Landslide Hazard Area (RCLHA) and flood risks within District of Squamish are beyond the scope of highway improvement project. Risks to highway users and workers are within the scope of project. Risk to highway users very low and about the same as other worker risks and individual worker risk criteria. Societal risk is considered low and in compliance with typical societal risk criteria. Multiple Account Evaluation supported construction of improvements to this section of highway on existing alignment, rather than relocation outside RCLHA.
VANCOUVER AREA	
Ryan Beckett. Upgrade will reduce driving time, fuel costs and vehicle emissions. Use Barge Loading Site near the marina be used rather that the emergency BC Ferries terminal because of the proximity of a provincial park near the Porteau Cove terminal.	Many drivers will experience a reduction in travel time, fuel consumption and exhaust emissions. The preference is to use the potential barge loading site at Sunset Marina and minimize using the emergency ferry dock at Porteau Cove.
Concord Investigations. Offered security and flagging services during highway construction.	**EAO Note:** No Response Required
M. Peel. Inquiry whether there will be Open Houses for the project.	**EAO Note**: Open House schedule forwarded by EAO.

Comment/ Issue	Ministry of Transportation Response
WEST VANCOUVER	
EAO Note: *After these comments from the public and responses were provided, the MoT undertook additional consultation and design work on options for the alignment in West Vancouver. The results of this work are reported in the Sea-to-Sky Highway Improvement Project Clarification Report – Horseshoe Bay to Sunset Beach (West Vancouver Segment),* April 2004 *(referred to as the West Vancouver Clarification Report) and reviewed by the Biophysical/Technical Working Group and the Socio-Economic Woking Group created by the EAO. The options for the preliminary alignment described in the West Vancouver Clarification Report replace Options 1 & 2 that were presented in the original Application document.* *The MoT proposes two revised options for certification, known as Option B and Option D.* ***Option B*** *is an overland route with four new lanes up-slope from the existing Highway 99 corridor. The existing highway would then serve only local and ferry traffic. No highway improvements are necessary on the existing highway between Marine Drive and Pasco Road since it reverts to local traffic use only.* ***Option D*** *consists of two new lanes up-slope from the existing Highway 99 corridor and includes a two-lane, two-way tunnel of approximately 1 km in length. The new tunnel route and the existing Highway 99 would each carry two-way traffic. Construction of the tunnel route would start at the north end of the Caulfield Interchange. Option D includes upgrading of the existing highway between Marine Drive and Pasco Road to accommodate a portion of the through traffic and improve traffic safety.*	
Natalie Drache. Strongly advocates minor changes only to the existing Sea-to-Sky highway for safety. Develop state-of-the-art alternate highway route dedicated to expansion and development of urban and potentially industrial centres co-developed and co-managed with prior and informed consent and participation of Squamish Nation. Safety factor with drivers unwilling to respect speed limits. Provide evidence of concrete changes based on public input.	While some alternate routes are technically feasible, there are considerable environmental, parks, First Nations, winter operations and other issues. The alternate routes are considerably more expensive and don't eliminate the requirement to improve the existing highway. I would like to advise that the objectives of the project are firstly to improve highway safety, secondly to improve highway reliability and thirdly to provide capacity improvements. Our objective is not to build a four lane speedway. The design speed for the highway is 80 km per hour with speed reductions through the urban areas.
Joseph Cantafio. Design detail suggestions: `Air Rights" over BCR to install bridge-like structures; consider lower cost alternative to conversion, use and reconversion of the BCR line as a temporary roadway.	This technology over the railway could be used to create a split grade alignment over the existing highway and could be workable if the issues of highway access and traffic delay could be managed. Some of the larger work packages will likely be procured through design-build, and the contractors will explore various options to arrive at the most cost-effective solution. MoT shares concerns over cost-effectiveness of using railway temporarily and will study the section between Brunswick Beach and Porteau Cove further for options.
H Benson – If BCR line between Horseshoe Bay and Squamish made fully available could widen road to this side and minimize blasting and rock removal	***EAO Note:*** *Point of Information.*
Herbert R. Bolz. Short tunnel option appears to be the best solution and should be expandable to four lanes.	Short tunnel is preferred option. Four laning tunnel does not provide value. A second tunnel could be considered in the future when traffic demand increases beyond capacity provided by this project. ***EAO Note****: For more information please refer to the West Vancouver Clarification Report*
Pascal J. Leprevost. Short tunnel option appears to be the best solution and should be expandable to four lanes.	Short tunnel is preferred option. Four laning tunnel does not provide value. A second tunnel could be considered in the future when traffic demand increases beyond capacity provided by this project. ***EAO Note****: For more information please refer to the West Vancouver Clarification Report*
Claire Rushton. Support tunnel option through Nelson Creek to Horseshoe Bay area and oppose dual level highway through this area on environmental and safety grounds. Ferry traffic needs to be addressed. Traffic is backed up on almost every weekend in the summer well beyond Caulfield exit. Concerns about safety, traffic congestion during project construction and ferry traffic parking on highway shoulder.	Project will improve ferry queues by removing northbound Highway 99 traffic from local and ferry traffic mix further east. Additional lanes connecting ferry toll plaza with ferry parking and operational improvements inside terminal will help alleviate some ferry traffic congestion outside of terminal. Current merging of Highway 99 southbound traffic with eastbound Highway 1 traffic from ferry is working from a safety perspective. MoT will manage safety and community construction impacts to the full extent possible. *EAO Note: For more information, see the West Vancouver Clarification Report*

Comment/ Issue	Ministry of Transportation Response
WEST VANCOUVER	
Gary Andrishak. • Prefer Option 1 to Option 2 in West Vancouver • Option 2 will present noise and dust pollution and safety issues during construction for residents of Westport Place. • If Option 2 chosen, construction impact mitigation measures must be developed jointly with residents of Westport Place	Preference is tunnel couplet versus surface couplet because of significant reduction in property and environmental impacts. Caulfield Interchange is part of strategy and will undertake a safety and operational review of the interchange to come up with a series of improvements. MoT will work to mitigate impacts from tunnel construction and require contractors to maintain highest standards of dust and noise control and noise control. Will definitely meet with community residents and develop mitigation strategies on a consultative basis. *EAO Note: For more information, see the West Vancouver Clarification Report for description of Options B and D.*
Darlene Holmes and Herbert Horn. Blasting for tunnel at Nelson Creek may damage homes at Westport Road. Construction noise concerns. Increased traffic problems at Caulfield Interchange if used as northbound turnaround for traffic from Horseshoe Bay. Westport road not designed to accommodate truck traffic. Noise from the tunnel portal may adversely impact nearby neighborhoods.	Pre-construction condition surveys are standard requirements when undertaking blasting, pile driving or other activities that could impact adjacent properties. A study is currently being undertaken of Caulfield Interchange. MoT established TLC and CAG to work with the community to identify impacts and develop and implement mitigation strategies. Noise mitigation will be a key topic of discussion with communities. MOT has noise mitigation guidelines for dealing with incremental noise increases due to highway projects. Contractors will determine routes for hauling. Will generally have to use the highway or designated truck routes and comply with municipal conditions.
James and Christine Hogan - Preserve trees at Pasco Road for scenic and environmental reasons (e.g. protect from runoff, landslides). Blasting may damage houses. Increased travel time to Ansell Place. Oppose use of BCR due to noise and traffic impacts. Travel time to Ansell Place with couplet extends 2 minute trip to 15 – 20 minutes	Tree clearing will be kept to absolute minimum. The planned improvements will address any instability or drainage issues resulting from the highway, and should result in improved safety. If the existing access with the highway is retained, we will ensure that safe access and egress is provided at this location. Regarding travel times and emergency response times to the southern Howe Sound communities, the MoT is developing solutions and is looking for a "shortcut" route to reduce or eliminate the need for the turnaround at Caulfield Interchange. *EAO Note: For more information, see the West Vancouver Clarification Report. The MoT no longer proposes to use the rail line as a detour during the Project construction.*
Klaus and Ludwina Schneider. Highway access at Ansell Place without an overpass is unsafe. Pasco Road right only access means drive to Caulfield to turnaround north. Build connection from Pasco Road to Citrus Wynd to allow access to highway via Ansell Place overpass. Create effective connection from Pasco Road to the Ansell Place turnoff.	Linkages with Ansell Place were conceptually examined by the preliminary design consultant. Both options had significant constructability, environmental and community concerns. The new intersection will have significant safety benefits over the existing situation. *EAO Note: For more information, see the West Vancouver Clarification Report.*
Peter and Karen Balogh. Current highway between Horseshoe Bay and Ansell Place will change from two way traffic to southbound only. This means current two minute drive from Pasco Road to Ansell Place will increase to 15 to 20 minutes because of need to go to Caulfield and then turn around. Also distance and time for emergency response increases. Protected left hand turn lane at Pasco Road not acceptable solution from safety perspective. Concern that more time should be given to gather public input. Consider a connection to Citrus Wynd.	Prime objective is for Pasco Road access northbound to be safe, whether protected T intersection or linkage with Ansell Place are implemented. MoT studies indicate that the best value to public is couplet system including a short tunnel. This raises the issues of connectivity, emergency response and impacts to Caulfield Interchange, all of which we recognize and for which we are developing mitigative solutions. MoT committed to project that improves highway safety, highway reliability, provides additional capacity where currently required, minimizes impacts to adjacent communities and provides best value to the public. *EAO Note: For more information, see the West Vancouver Clarification Report.*
Peter Balogh – Lack of northbound access from Pasco Road increases travel time to Ansell Place for local traffic. Couplet will increase emergency response times between Ansell Place and Horseshoe Bay. Minimize tree removal and design drainage to accommodate run-off. Oppose use of BCR during construction because of traffic (noise) impacts to Pasco Road residents.	EAO Note: *For more information, see the West Vancouver Clarification Report. The MoT no longer proposes to use the rail line as a detour during the Project construction.*

Comment/ Issue	Ministry of Transportation Response
WEST VANCOUVER	
Alan and Isabelle Procter. Lack of northbound access from Pasco Road increases travel time to Ansell Place for local traffic. Couplet will increase emergency response times between Ansell Place and Horseshoe Bay. Minimize tree removal and design drainage to accommodate run-off. Oppose use of BCR during construction because of traffic (noise) impacts to Pasco Road residents.	Project team assessing "shortcut" alternatives to provide more direct highway access for northbound access which will also improve emergency response. Will ensure Pasco Road intersection is safe by ensuring sightlines provide for safe left turn movements and including acceleration lane for merging speed into the northbound traffic. Noise factors will be included in feasibility assessment for rock disposal. Excavated materials transported by truck will be confined to highways and designated truck routes or contractors will follow local government approval processes. Designers and contractors will exercise due diligence to ensure downstream properties not negatively impacted by drainage. Tree removal will be kept to a minimum to construct highway improvements. **EAO Note**: *For more information, see the West Vancouver Clarification Report. The MoT no longer proposes to use the rail line as a detour during the Project construction.*
Frank Musson. Design Issues: Pasco Road traffic must go south to Caulfield to turn around and go north. Sidewalk and light at intersection near Rockridge School will be inadequate. Endorse three kilometre tunnel with traffic in both directions as a better option. Noise from the tunnel and construction noise. Gravel road near Westport Place should not be used as an access route for construction trucks and vehicles. Support 3 kilometre bi-directional tunnel option	MoT studies show the couplet concept provides considerably higher public value, in highway safety and long term functionality. Looking at possible solutions to mitigate inconvenience of access to Highway 99, emergency response to the southern Howe Sound communities and impacts to Caulfield Interchange. MoT has no technical information to show 3 kilometer tunnel starting at Eagle Creek provides better value to the public than the shorter tunnel. Truck haul will have to be confined to highway and designated truck routes. If an alternate route is feasible off-highway on a non-truck route, this would require agreement by local government. . **EAO Note**: *For more information, see the West Vancouver Clarification Report.*
Dennis and Patricia Konasewich. Project not clearly defined including specific components around West Vancouver. Application to EAO is incomplete. Lack of long-term planning. Concern with noise during construction and operation of the highway project. Sampling to establish baseline levels for noise not representative because done when traffic volumes were light. Noise barriers will be required prior to and after construction. Environmental assessment makes no reference about potential impact on residential buildings due to vibrations from blasting. Blasting during construction may impact residents of Ansell Place and Bedora Place. Emergency response time will increase since nearest fire truck (at Horseshoe Bay) will have to travel south to Caulfield, then north towards our development. Ansell Creek drains into part of ocean rich in biota and sedimentation in the creek could have adverse impact. Should have been planning sessions with residents along the highway to ensure optimal long-term socio-economic benefits for the highway. Quantitative risk evaluation of 70,000 truck loads going to this road is necessary, as many people do live in the direct vicinity of Sunset Beach.	MoT had to "freeze" the presentation material to prepare the Application at the conceptual design level to meet schedule objectives. MoT working to improve design concepts to provide better value and reduce impacts as much as possible. Preference is for short tunnel northbound couplet option with existing highway providing southbound lanes. Ministry's noise mitigation guidelines consider incremental noise increases attributable to proposed highway improvements. Project will continue to work with communities to develop practical methods of mitigating traffic noise, such as use of super-pave (quiet pavement) within urban areas. Recognize this presents challenges for access to the highway and emergency response and are working at solutions. Generally 2025 used for planning horizon. Goal is long term safety, reliability and mobility improvements to the highway. The Olympics provide a catalyst for this project. Improvements will have a positive impact on safety in the Horseshoe Bay area and ferry traffic congestion. MoT working with CAG to provide community input into project design. MoT will require the contractors undertake pre-construction inspections of private buildings prior to undertaking construction activities that could cause damage, such as blasting and pile driving. This will provide baseline condition information to identify any damage caused by construction. Assessing feasibility of using conveyor system to transport materials from highway to barge loading facility to reduce impacts to local communities. . **EAO Note**: *For more information, see the West Vancouver Clarification Report.*
John Roberts. Concern over lack of design detail provided by MoT. Recommend two way tunnel and use of the current alignment by trucks and as a scenic route. Concern over increases in emergency response time, extended trip length to access ferry, increased traffic via Eagleridge or Caulfield exit, grater travel times for Lions Bay children attending Gleneagles Elementary and noise impacts at the school.	. **EAO Note**: *For more information, see the West Vancouver Clarification Report.*

Comment/ Issue	Ministry of Transportation Response
WEST VANCOUVER	
Bruce McArthur. Impact on travel times for emergency services between Horseshoe Bay and Sunset Beach. Noise baseline monitoring did not include Gleneagles School. Ferry traffic and highway traffic management. Rock haul – volumes and routes information needed. What are Larsen Creek wetlands mitigation proposals? Design speeds. Hopes that the assessment period will be extended. Nine questions about highway design, noise, traffic, emissions impacts and Larsen Creek wetlands primarily related to the West Vancouver area.	Recognize emergency response is an issue and working on solutions to mitigate these concerns. For noise data, Wakefield Acoustics Ltd. selected sites that were representative of locations anticipated to be maximally exposed to project noise impacts. For rock disposal, MoT assessing feasibility of a conveyor system to transport materials from the highway to barge loading sites or rail cars. Objective at this time is to assess the feasibility of various disposal options, identify issues and constraints associated with these options, ensure these issues and constraints are communicated in our contract specifications, then allow contractors the latitude to manage their material disposal requirements. For Larsen Creek wetlands, the surface couplet option includes a high bridge crossing of Larsen Creek downstream of the wetlands and there will be no impact on the wetlands. CSD criteria is for an 80 km per hour design standard in rural areas and 60 to 70 km per hour in urban areas. . ***EAO Note***: *For more information, see the West Vancouver Clarification Report.*
Mike Fillipoff. Provide bicycle access along the entire length of the highway.	Ultimate design standard includes, at a minimum, 1.5m shoulders throughout, which is suitable for cyclists. Improvements between Brunswick Beach and Furry Creek are not included in current scope and are deferred to after 2010.
Anders I. Ourom, Climbers'Access Society of BC. Preserve Leviticus Rock in Murrin Park by shifting the alignment and concerned about damage to Jalap Bluff and parking and access for climbers to this area. Preserve use of existing parking area for climbers accessing Stawamus Chief. Concern over losses or reductions to parking areas for climbers wishing to access Malamute and Apron	Upland Recreation Impact Study identified many of the areas of concern. MoT suggests that project team work with the society, and others with similar interests, through a structured focus group or committee to address issues consistent with recommendations from Upland Recreation Impact Assessment Report and will contact you in near future. ***EAO Note***: *This was done.*
P. Kubik. Concerned with potential affects on recreational hiking on trails between Squamish and Horseshoe Bay.	Recreation assessment done by a recreational consultant. Access to all identified trails along the corridor will be maintained where possible. Preliminary highway designers and recreational consultant will assess trail access points to ensure safe access, egress and parking can be provided.

Comment/ Issue	Ministry of Transportation Response
LIONS BAY	
EAO Note: *After these comments from the public and responses from the MoT on the alignment in the Lions Bay area were submitted, the MoT conducted additional consultation with the community of Lions Bay in 2004 and the results are reported in the Sea-to-Sky Highway Improvement Project, Clarification Report, Village of Lions Bay, March 2004 (known as the Lions Bay Clarification Report). The MoT subsequently wrote to the Mayor and Council of Lions Bay on May 7, 2004 to advise that, based on the support in the public consultation and the project objectives, the Ministry is proceeding to the preliminary design stage with the 4 lane option. This includes mini-changes at Kelvin Grove and Brunswick Beach. Further engineering will provide information required for other design elements such as noise barriers and intersection design. The MoT has also committed to work with the Lions Bay community to reduce current highway noise by 4 to 5 dB through mitigation measures, such as open graded asphalt and speed reduction. Further, MoT is prepared to work with the community to make best efforts to incorporate noise barriers and other noise mitigation efforts where effective, which could result in a further 5dB reduction. (OCR 9.5). The MoT has also advised the EAO that it no longer proposes to use the BCR (now CN Rail Line) as a detour for traffic during the construction phase of the Project. The rail bed wil be used as a third lane for southbound traffic between Furry Creek and Brunswick Beach during the Olympics and the access from the rail line to the highway in the Brunswick beach are has been moved further north and will either be just to the north of Magnesia Creek Bridge or just to the south of M Creek Bridge.*	
Victor Miles - 2km stretch through Lions Bay should remain 2 lanes and for social, environmental and economic reasons, merge from 3 lanes to two just north of Lions Bay. Concern about impact to property values.	***EAO Note***: See Above
Myron, Susan and Miranda Loutet. 4 laning in Lions Bay. Strongly oppose project unless noise abatement and safety concerns are addressed.	MoT will work with CAG to address critical noise and safety issues.
Nancy Seow. Oppose four laning in Lions Bay due to increased noise, bottlennecks where traffic reverts to two lanes, increased air pollution.	MoT normally considers four laning when Annual Average Daily Traffic (AADT) volumes reach 10,000. Current AADT between Horseshoe Bay and Lions Bay is approaching 14,000. Design speed for highway will be 80 km per hour except in urban areas where design speed will be in the order of 60 km per hour. Since Brunswick Beach to Furry Creek has a relatively lower AADT, MoT will defer construction (new lanes) in this section until after 2010. No technical basis for traffic backlogs to occur in Lions Bay and transition zone from two lanes northbound to one lane northbound can be adjusted to alleviate this possibility.
S. Stokes 4 laning in Lions Bay will create increased noise and safety issues and then merging from 4 to 2 lanes increase traffic congestion and encourage speeding. Can EIA be done without detailed design information and without final options available?	Improving highway safety is the number one objective of this project. Normally the MoT considers four lanes when Annual Average Daily Traffic (AADT) approaches 10,000. Currently, the AADT between Horseshoe Bay and Lions Bay is approaching 14,000 and 11,000 between Lions Bay and Squamish. MoT recognizes that controlling speed within the community will also contribute to noise reduction and is working with the CAG to identify other practical solutions. The Noise Assessment Study was a corridor-level study only. CH2M Hill have retained a noise specialist for the urban Lions Bay area and made a more detailed noise assessment presentation to the CAG.
Sheila Blake. 4 laning through Lions Bay and merging to 2 lanes will result in increased noise, safety and air pollution impacts and traffic congestion. Consider alternate highway route. Move merge to 2 lanes north to Lonetree Creek How can EIA be done without detailed design information?	Number one objective is to improve highway safety performance. Highway standard for corridor is 80 km per hour using CSD guidelines, which emphasize highway design within the constraints of environment, aesthetic and community values. There are significant costs, topographic, environmental and First Nations issues with alternate route through Indian Arm and would not eliminate need to improve existing highway. Transition point from two lanes to one lane northbound will be far enough north to avoid traffic backups through Lions Bay. Public input is essential to success of the project.

Comment/ Issue	Ministry of Transportation Response
LIONS BAY	
Renate and Dieter Alberts. Concern that 4 lanes through Lions Bay will create speeding and accidents where road narrows again to 2 lanes as well as traffic jams and air pollution from idling vehicles.	***EAO Note**: See above response*
M. B. Le Boutillier. Concern with noise and pollution if four lanes through Lions Bay.	Improving highway safety is the number one objective of the project. Transition from four lanes to two, will occur far enough north to avoid the traffic issues in Lions Bay. Noise mitigation consistent with Ministry policy and mitigation measures used on other Ministry projects will be considered for Lions Bay.
Colleen & Jim Dickinson. Oppose four lanes through Lions Bay. Will result in speeding and excessive traffic noise. Improve existing section with tree plantings, assist with funds to top trees obstructing viewscapes for some residents. Should have considered an alternate direct overland route to Whistler Want better rationale for the project that considers needs of the residents and not just the Olympics.	MoT normally considers four laning when Annual Average Daily Traffic (AADT) volumes reach 10,000. Current AADT between Horseshoe Bay and Lions Bay is approaching 14,000 and 11,000 between Lions Bay and Squamish. Four lanes required between Horseshoe Bay and Lions Bay. Number one objective is to improve highway safety. Design standard is 80 km per hour using CSD methodology. Speed reduction will be provided in urban areas, such as Lions Bay. Transition point from two *lanes to* one will be north of the community. Obstruction of views is a community issue. MoT may become involved if trees are danger trees at imminent risk of falling onto highway. Several studies have examined alternate routes that are technically feasible but present environment, parks, First Nations and winter operations issues and are more expensive.
Danielle Wenkstern. Project will create increased noise. Oppose four lanes through Lions Bay. The project should include steps to reduce existing traffic noise and if this is too expensive then offer Village residents a revenue-sharing option be offered to Village residents for consideration	The MoT retained a noise specialist to assist with this aspect of their assignment. Objectives include identifying the real impacts in terms of safety, traffic speeds, traffic noise, community connectivity and aesthetics and work with the community to develop practical solutions to mitigate any negative impacts. Project team will work with communities to develop practical solutions to reduce traffic noise, including super pavement (quiet pavement) through urban areas. MoT has technical guidelines for cost sharing with municipalities. Generally, MoT responsible for costs of highway improvements, the municipality bears costs of urban features.
Lawrence Ruskin. Do not 4-lane Lions Bay until entire highway upgraded to 4 lanes. Noise levels already high and will increase. Don't believe proposed traffic calming measures will work. Put cover over noisy parts of the road to mitigate noise. Concern that noise monitoring for baselines readings not done in the correct locations	One reason for speeding within Lions Bay is lack of village or urban atmosphere. Context Sensitive Design (CSD) will influence driver behaviour through design application. MoT is working with CAG to improve highway aesthetics. Building four lanes through Lions Bay now, but not using two of the lanes until the remainder of the highway is four laned offers no incremental benefit to highway users. Will locate transition area north of Lions Bay and seek to avoid impacts from traffic bottlenecks. Noise attenuation measures will be considered for Lions Bay. Noise monitoring equipment was placed in areas where mitigation was considered feasible.
Robert and Gail McFarland. Concerns about noise and speeding in Lions Bay. 4-lane narrowing to 2-lane will create problems. Motorcycle noise and speeding in Kelvin Grove as roadway narrows to two lanes.	Noise is concern in most urban areas along the corridor. Project team will work with communities to develop and implement practical mitigation measures. Context Sensitive Design will provide visual indicators to the driver that will have a significant impact to the reduction of speeding. Noise modelling will be done and presented to the community. Additional noise measurements have been done and will help to develop solutions for avoidance and mitigation of noise.
Trudi, Rudy and Simon Luethy. Increased noise, accidents, "4 lane-racetrack" through Lions Bay	Primary objective is to improve highway safety. Design standard for the highway is 80 km with speed reductions in urban areas like Lions Bay from developing village character into highway. Noise monitoring was done at locations where mitigation would be most feasible. Ground level noise measured because it could be mitigatable with noise attenuation fencing. Wakefield Acoustics provided report to CAG on baseline noise levels.

Comment/ Issue	Ministry of Transportation Response
LIONS BAY	
Gillian Smith. Concerns with noise and speeding in Lions Bay and recommends noise mitigation and only two lanes in Lions Bay.	Noise mitigation measures, consistent with Ministry policy and treatments used on other projects, including use of "quiet" pavement, will be considered for Lions Bay. Intend to work with community to develop village character into highway to reduce traveling speeds.
Alex Murdoch. Concern about noise levels and increases in Lions Bay. Want a road surface designed to minimize noise and a sound barrier in order to enjoy a normal life.	MoT working with CAG and will continue to consult to develop practical solutions to mitigate nose. At a minimum, solutions will include use of super pavement (quiet pavement).
Mrs. R. Hutton. Concern about increased noise and safety for children crossing the highway.	Highway noise is a concern of many in Lions Bay and in other communities along corridor. A noise specialist is on the MoT design project team. Objective is to minimize project impacts to communities. MoT project team will continue to work with community to develop practical noise mitigation.
Janice Wilson. Concern about noise and minimizing impacts to the local landscape in Lions Bay area.	Highway improvements should remain within existing roadway as much as possible. Will implement the alternate access road between the railroad and the highway near M Creek as shown on Application drawings.
Andrew Crane. Aesthetics and effect of the project on residents treatment is inadequate.	MoT committed to Context Sensitive Design. Technical Liaison Committee and the Community Advisory Groups provide opportunity for community input.
Greg Turpin. Imperative that interconnectivity along Sea to Sky Highway is maintained. Application seems to focus on travel to Whistler and not on corridor residents who account for about 1/3 of the traffic on the highway. Noise from existing highway has disturbed sleep in Lions Bay. Accident rate will escalate with four-lane highway merging down to a two-lane highway. Unimpressed by public consultation meetings, because of lacking information. Looking for more detail on project design such as access to highway from Strachan Point. Important to preserve highway connectivity. Only Kelvin Grove will have "right in" and "right out" access unless there is provision for interconnecting roads and an underpass. From Upper Kelvin Grove people headed to Lions Bay will have to drive to Ansell Place to turn Pasco Road access is flawed in safety and reliability. Concern about emergency access to Upper Kelvin Grove. What budget is there to improve the Caulfield over pass system? Concerns with construction interruptions.	This is a long term project and the design processes are being staged to suit an overall design and construction program to facilitate completion in late 2008 or 2009. Noise mitigation will be consistent with Ministry policy and mitigation measures used on other Ministry projects. MoT realizes connectivity is an important issue and is working with the CAG to find solutions. MoT looking to minimize or eliminate requirement to use Caulfield Interchange for a turnaround, an operational and safety study should be complete this year. Transition to narrowing of highway north of Lions Bay to existing two lanes will be located to not impact Lions Bay and will provide safe traffic merging traffic. There will be delays to the public during construction, but MoT will minimize these to the extent possible and also minimize the frequency and duration of full highway closures. MoT will keep the traveling public and communities informed of traffic pattern changes and delays to the full extent possible. This will allow people to adjust their schedules, to the extent possible, to avoid delays. **EAO Note**: *For more information, see the Lions Bay Clarification Report.*
Greg Turpin. Existing highway is noisy, results in sleep disturbance at night if house windows open. Safety concerns about accidents from speeding if 4 lanes through Lions Bay. Concern that project information on access (right/left turnout) to highway from Kelvin Grove not accurate and unimpressed by public consultation meetings, because of lack of updated information. To access Lions Bay from Upper Kelvin Grove will have to go to Ansell Place to turn around and turn around. Increases travel time and emergency response times. Travel time for school children from Lions Bay to Gleneagles will increase.	Will minimize impacts to mobility during construction by avoiding high rock slope excavation wherever possible. Slowing design speed to avoid a series of tunnels would have a much higher impact on travelers. Will minimize full highway closures, keep traveling public/communities informed and time closures to avoid critical periods, to the extent possible. Noise mitigation, consistent with Ministry policy and mitigation measures used on other Ministry projects, will be considered for Lions Bay. Working with CAG to find solutions to community connectivity. Looking for solutions to minimize or eliminate use of Caulfield Interchange for a turnaround. An operational and safety study should be complete this year. Narrowing of highway north of Lions Bay to two lanes will be located north of Lions Bay and will provide safe merging of traffic.

Comment/ Issue	Ministry of Transportation Response
LIONS BAY	
Andrew Crane. Difficult to judge merits and demerits of a project when design options have not yet been presented to the public. Design options will be available late in November or December after the EA review public comment period has passed. Delay approval of the application, at least the portion that affects the Village of Lions Bay, until public meeting is held where design options are available to residents. Community access issues in Kelvin Grove area not sufficiently addressed. Current design requires traffic from lower Kelvin grove to travel 6.4 south to Ansell Place to access northbound lane. This is serious inconvenience to residents.	Project team met with the CAG in October to discuss design concepts and seek advice as to the level of detail required for presentation to the public. When design work completed to sufficient level of detail, CAG and the Project Team will present design alternatives to the community. Application does state that turnaround location would be at Ansell Place. ***EAO Note: Since these** comments on the alignment in the Lions Bay area were provided, the MoT conducted additional consultation with the community of Lions Bay in 2004 and the results are reported in the Sea-to-Sky Highway Improvement Project, Clarification Report, Village of Lions Bay, March 2004 (known as the Lions Bay Clarification Report). The MoT subsequently wrote to the Mayor and Council of Lions Bay on May 7, 2004 to advise that, based on the support in the public consultation and the project objectives, the Ministry is proceeding to the preliminary design stage with the 4 lane option. This includes mini-changes at Kelvin Grove and Brunswick Beach.*
Carlos S. Castellon. Concern with four lane highway through Lions Bay. To walk to and from Calvin Grove to the City Hall or to walk to Brunswick will become a more dangerous, especially for children going to school. Should consider first the liveable neighborhoods, the children of our communities and the interaction of the community including the impact to our quality of life that a four lane highway will create. The four lanes end within the Village so that all the traffic back-up will happen exactly where we live. This means increased air pollution, noise pollution and visual pollution.	Number one project objective is to improve highway safety on this corridor. The design speed is 80 km per hour, with speed reduction through the communities. The project has adopted Context Sensitive Design that promotes highway design within the context of environmental, community and cultural values. With respect to the transitioning from four lanes to two, this will occur far enough north to avoid the traffic issues you reference in your letter. Currently it would appear that transitioning north of Magnesia Creek, or possibly constructing to the current northbound passing lane north of M Creek, may be appropriate. ***EAO Note**: For more information, see the Lions Bay Clarification Report.*
Carlos S. Castellon. The improvement of the highway along Lions Bay includes a new traffic exchange in Calvin Grove. The designers should consider lowering the highway building an underpass and keeping the surface road for the neighborhood. Calvin Road uphill is very steep. Lowering the highway will recess the cars into a trench cutting the visual and noise pollution.	With respect to Kelvin Grove, this is one of the elements of community connectivity that needs to be resolved. We are working with the Community Advisory Group to develop solutions for this. *The MoT subsequently wrote to the Mayor and Council of Lions Bay on May 7, 2004 to advise that, based on the support in the public consultation and the project objectives, the Ministry is proceeding to the preliminary design stage with the 4 lane option. This includes mini-changes at Kelvin Grove and Brunswick Beach.*
Jim Hughes. Lions Bay Community Advisory Group. Concerned with lack of progress on more detailed designs for alignment through Lions Bay. Wants more work done on design options for tunnel and "snow shed" options through Lions Bay.	Level of detail commensurate with the progress of the design assignment. Committed to addressing Lions Bay community concerns, especially to noise and safety. A recommended option will be presented to CAG and community and will be refined and advanced through preliminary and detailed design. ***EAO Note**: This was done.*
Andrew Crane. Noise assessment for Lions Bay not adequately addressed. Concern about reliability of noise baseline monitoring. Noise will increase with traffic volume increases. Aesthetics should consider community and not only drivers perspective.	Noise impact assessment was a high level study. Information is preliminary and subject to further design developments. More comprehensive database will be used to develop design concepts to help avoid and/or mitigate noise impacts.
Louis K. Peterson. Increased traffic noise. Concern that the MoT noise monitoring not done effectively and that baseline data is unreliable and not representative of the section of Lions Bay most adversely affected by noise. Current noise pollution already adversely affecting residents and should be reduced by appropriate mitigation measures.	Additional baseline noise measurements have been done and submitted to CAG. MoT will consider noise mitigation measures consistent with their policy and approach on similar projects. ***EAO Note**: Independent review of baseline noise data collection methodology in Lions Bay was completed.*

Comment/ Issue	Ministry of Transportation Response
LIONS BAY	
Don Campbell. Noise concerns and how baseline data collected	Noise mitigation measures, consistent with Ministry policy and treatments used on other projects will be considered for Lions Bay. Wakefield Acoustics presented a report to CAG that explains the methodology and method for correlating noise levels to traffic volumes. ***EAO Note:*** *Subsequent review and verification of noise data and collection process done by independent U.S. consultant.*
Mike R. Wilson. Proposed access to BCR from Brunswick Pit Junction runs behind residences on Brunswick Beach Road and should be relocated north of Magnesia Creek to avoid noise impacts and loss of trees. Find balance between an urban and rural lifestyle.	To avoid impacting the community, MOT will not detour traffic onto BCR corridor through Lions Bay and access road tie-in will be constructed north of Brunswick Beach. MoT committed to work with the community through the CAG to develop a project that serves and respects communities through which it passes. ***EAO Note:*** *The MoT has advised the EAO that it no longer proposes to use the BCR (now CN Rail Line) as a detour for traffic during the construction phase of the Project. The rail bed wil be used as a third lane for southbound traffic between Furry Creek and Brunswick Beach during the Olympics and the access from the rail line to the highway in the Brunswick beach are has been moved further north to either just north of Magnesia Creek Bridge or just south of M Creek Bridge.*
Samantha Gardiner. Petition presented with 100% of households from Brunswick Beach residents signing. Plans are unacceptable because of noise impacts. Merging four lanes to two lanes too close to residential property. Requesting merge occur at M Creek, not Magnesia Creek. Paving of BC Rail and diversion of traffic too close to residential property. Requesting it occurs at or after M Creek. Request a pedestrian crossing at Brunswick Beach	Lions Bay CAG with Brunswick Beach representation are working through various technical and community issues. Analysis, including community impacts, will determine transition from four lanes to two. Project team will work with the CAG, strongly consider their concerns and recommendations, and provide technical justification for the position. Access ramp between BC Rail and highway through Brunswick Beach will be constructed north in M Creek area. Proposed T intersection will provide safety benefits over current situation.
Carlota A Castellon. Concerned that four lanes ending at Brunswick Beach will increase speeding. Quality of life will be decreased with additional pavement, vehicles speeding, traffic bottlenecks, views tarnished, exhaust fumes, increases in noise. How will medical transportation occur if road is closed? Clarification requested on road closures and tolling.	Improving highway safety is number one project objective. Design speed is 80 km per hour. Intend to improve travel times by reducing delays, not by increasing speed. Additional passing lanes where they are most required will reduce driver aggression and accidents. Transition from four lanes to two will occur far enough north Lions Bay to avoid traffic issues. Will keep traveling public and communities informed of traffic pattern changes and delays to full extent possible. Closures will be timed to avoid critical periods, to extent possible. Work will be done in a series of contracts using various options of contracting but none of these options will include tolls. Tolls will not be implemented on this highway.
Renate and Dieter Alberts. Generally pleased with design up to Lions Bay. Great concern with only two lanes for section from Lions Bay to Furry Creek, the most dangerous part of the Sea-to-Sky-Highway where most serious accidents occur. Traffic jams and cars idling will cause air pollution. A four lane highway is needed in this area.	As highway volumes increase, need for passing opportunities increases. Four lanes currently required between Horseshoe Bay and Lions Bay, but can be deferred between Lions Bay and Squamish until 2017. MoT will consider issue of traffic queuing when siting location of transition from four lanes to two lanes.
Anne C. Page. Require more project detailed design to conduct meaningful review. Concern over noise impacts and barrier effect. Would like alternate route to Whistler explored.	Project design is long-term process. MoT working with CAG to find solutions. Will not use BC Rail for third lane during the Olympics within Brunswick Beach. Alternate routes are technically feasible but present other issues (e.g. environment, parks, winter operations) and are more expensive and do not eliminate requirement to improve existing highway. Intend to work with community to develop village character into highway to reduce traveling speeds. **EAO Note**: *For more information, see the Lions Bay Clarification Report.*

Comment/ Issue	Ministry of Transportation Response
LIONS BAY	
Greg Weary. Need more project detail to properly assess environmental and social impacts to Lions Bay. Noise – already high and will increase. Application states that no mitigation required according to MoT policy. Aesthetics – Enhance the aesthetics of the existing roadway and do so in consultation with the community	Design consultant for Lions Bay section retained an acoustic specialist and more detailed baseline assessments have been completed and presented to CAG. Noise attenuation measures, consistent with Ministry's policy and measures utilized on other Ministry projects, will be considered for Lions Bay. Recognize desire of community for "village atmosphere". Objective is to develop urban features to improve aesthetics, help create village atmosphere and alert drivers they are entering or passing through an urban community.
Richard J. Bennetts. Widen road between Porteau Cove and Horseshoe Bay. 3 lanes merges are dangerous. Long term solution is four lane divided highway between Horseshoe Bay and Porteau Cove that reduces or eliminates the sharp corners. Increase police patrols on this stretch. Safety issue should be the primary concern.	Number one objective of the project is to improve highway safety. Second objective is to improve highway reliability. Third objective of the project is to provide capacity improvements where they are currently warranted. MoT considers four laning when Annual Average Daily Traffic (AADT) approaches 10,000. AADT between Horseshoe Bay and Lions Bay is approaching 14,000, and 11,000 between Lions Bay and Squamish. Ultimate design standard is four lanes divided between Horseshoe Bay and Squamish and three lanes between urban Squamish and Whistler with one lane in each direction with continuous passing lanes, alternating between northbound and southbound. Improvements to ultimate design standard deferred because of concerns with negative effects from highway closures and delays during construction.
Cathie Ratz. Concern of adverse impact to Lions Bay Community School commuters from daytime road closures. Why are night time closures not an option?	To minimize the delay to the traveling public as much as possible MoT will design highway improvements that can be constructed with least amount of traffic delay. Work with communities to understand their needs and constraints and provide thorough public information on highway closures and delays. Where feasible and appropriate, work will be done at night. Night closures are being considered. Blasting generally has to be done during daylight hours for safety reasons, and noise impacts on adjacent communities also needs consideration.
BRITANNIA BEACH	
Tony Mahood, regarding Makin property south of Britannia Beach. Concern with finding a proper Highway alignment through Makin property. Want commitment from Ministry to start clean-up of contaminated soil mistakenly placed on the Makin lands during the 1991 flood clean-up.	MoT agrees to work together to develop a mutually beneficial project. Partial bypass option through Makin lands is an alternative alignment in Application. Will continue dialogue with Makin Britannia to resolve issues. Construction planned for late 2006 which leaves time to work for a solution that provides best value to the public. Addressing materials stockpiled on Makin lands is part of a multi-agency initiative for environmental clean-up of the Britannia area.
Pam Tattersfield. Suggestions for adjustments to detailed road and intersection design within Britannia Beach and Squamish.	Geometric improvements under designer's preferred option will be done south of existing Furry Creek Bridge and includes extending southbound passing lane to northern end of Porteau Bluffs. Access near the Furry Creek Golf Course 14th hole will be closed. Safety will be the main objective with intersection treatments at Britannia Creek. MoT will consider practical solutions to mitigate noise through the corridor communities, including the use of "quiet" pavement. Current strategy is for 3rd lane adjacent to Mining Museum to be temporary during Olympics.

Comment/ Issue	Ministry of Transportation Response
FURRY CREEK	
Anita Schmitt. Noise impacts in Furry Creek. Questions the project rationale, appears that Olympics not safety improvements are basis for the roadworks. Concern that MoT did not consider earlier input from Furry Creek committee regarding studies on noise mitigation and solutions. Air pollution will be a factor on those residing in the corridor. Design Issues - Add passing lanes not 4 lanes between Porteau Cove and Lions Bay. Interchange/access design extends travel for Strachan Point residents wishing to drive to Lions Bay.	Number one objective is to improve safety. The MoT normally considers four laning when Annual Average Daily Traffic (AADT) volumes reach 10,000. AADT is currently approaching 14,000 between Horseshoe Bay and Lions Bay. AADT drops to about 11,000 north of Lions Bay, therefore four laning can be deferred in the short term but will be required by 2017. An operational and safety review of Caulfield Interchange is being done to identify improvements to the interchange that can be staged. Project team will continue to work with the Technical Liaison Committee and CAG to develop practical solutions to mitigate noise. MoT is considering quiet pavement through all of the urban areas, including Furry Creek. Several studies have examined alternate routes that are technically feasible but present environment, parks, First Nations and winter operations issues and are more expensive.
Derek B. Milne. Highway needs regular passing opportunities, not four lanes from Horseshoe Bay to Whistler. Concerns about safety and speeding with 3 or 4 lane upgrade. Take out some very tight bends between three lane section approaching Windy Point and south to Horseshoe Bay. Make driving in the passing lane with no intention of passing an infraction with a significant penalty.	Agree current highway deficient in passing opportunities. MoT normally considers four laning when Annual Average Daily Traffic (AADT) volumes reach 10,000. Current AADT between Horseshoe Bay and Lions Bay is approaching 14,000 and 11,000 between Lions Bay and Squamish. Four lanes required between Horseshoe Bay and Lions Bay and four lanes can be deferred in short term between Lions Bay and Squamish. From Furry Creek to Squamish, regularly spaced passing lanes will be provided. There will be speed reduction zones through the communities. The key objectives of the project are to improve highway safety and reliability with capacity improvements provided where currently required. "Slower Traffic Keep Right", instructions posted at the start of passing lanes are regulatory and enforceable by the police.
Keith and Kyoko Mukai Oliver. Want effective measures to reduce noise and control speed (e.g. enforce 60kph speed limit, baffles and quiet pavement).	Impractical to reduce speed through Furry Creek because highway is built to a higher design speed through this area. MoT will work with CAG to identify practical measures to mitigate highway noise, including use of "quiet" pavement through Furry Creek.
Tom Davis. No single solution to the current and future (increased) level of noise generated by highway traffic. A multi-faceted approach must be implemented. Proposed upgrades will bring higher speeds, the potential for larger and more serious accidents involving a greater number of vehicles. Rather than replacing the existing highway with a 3 to 4 lane racetrack, preserve scenic drive, improve safety and traffic handling capacity and retain and enhance the sense of community as the highway passes through the various residential communities along the highway.	Several studies show alternate routes are technically feasible but present environment, parks, First Nations and winter operations issues and are more expensive. With respect to noise mitigation, speed reduction and providing urban character within the communities, the project team is working through the TLC and CAG to identify practical measures to address these issues. The measures considered for noise mitigation include use of quiet pavement, noise buffers and other means. It is also a key objective to reduce speeds through urban areas and this can be achieved through various means, including portal treatments, median treatments, lane narrowing and other urban features. Design speed is 80 km per hour with speed reduction in urban areas.
Peter and Gisela Wirth. Noise impacts in Furry Creek - Recommend tunnel or sound barrier wall with a dense planting of conifers to mitigate sound.	Highway improvements will be minimal through Furry Creek, since the current highway has four lanes at present. Some work will be carried out at the south end of Furry Creek, including a new bridge structure Tunnel through Furry Creek is not included in project scope. Incremental increase through Furry Creek is estimated to be minimal. MoT will continue to work with community to develop practical measures to reduce noise, including use of "quiet" pavement.

Comment/ Issue	Ministry of Transportation Response
SQUAMISH	
Doug Lye. Support upgrade to four lanes along the entire highway and want reduction in traffic lights along the highway.	Ultimate strategy to horizon year of 2025 is to provide four lanes between Horseshoe Bay and Squamish and three lanes between Squamish and Whistler. Four-laning in urban Squamish will help alleviate traffic queuing. Traffic platooning and related driver frustration will be significantly alleviated.
Andrea Harris. Should include measures to encourage use of alternative modes of transportation (bus, train, ferry) as part of the scope of the project.	Numerous corridor transportation studies undertaken. Some focus on multi-modal transportation options, including commuter ferry, passenger rail (both on the existing track alignment and on higher speed track alignment) and expanded transit service. Generally, studies conclude other modes of travel, will not divert enough ridership off the highway to alleviate current need to undertake highway improvements. Primary objectives of this project are firstly to improve safety, secondly to improve highway reliability and thirdly to provide capacity improvements where they are currently required.
John K. Erickson. Detail design issues • Eagle Ridge north through Horseshoe Bay not at the same elevation and why drop in elevation at Stick Point and Porteau? • Why necessary to travel north from Horseshoe Bay to Caulfield exit and turn around access ferry terminal? • Why four lanes in Lions Bay? • Why not use West Coast Express on the BC Rail for the Olympics?	Two options proposed for the Highway 99 northbound routing from Highway 1 westbound. Surface couplet option would exit from Highway 1 just west of Nelson Creek Bridge, rise approximately parallel with Highway 1 and pass over Eagleridge Drive on east end of Eagleridge Interchange. This alignment facilitates on-ramp to Highway 99 at this location. Caulfield Interchange is nearest turnaround available to get into the ferry traffic when travelling southbound. New interchange or turnaround not included in this project. Olympic Bid Corporation studied options for transportation strategy for Olympics Games.
D Gagné. Daily Squamish to Whistler commuter and questions why traffic stoppages have increased in the past three weeks.	Assuming stoppage locations is in Culliton Creek-Cheakamus Canyon section currently under construction (not part of EA review), provides Culliton-Cheakamus Project Office phone number and states delays, when necessary, will be well advertised, occur during non-peak travel times and be as short as possible.
John Irvine. Impacts to cyclists from exhaust fumes in the tunnel and concern that 2m shoulder will not be constructed along the entire length of the alignment. Interest to see alternative modes of transportation examined (bus, rail).	Tunnel will have a ventilation system and CO_2 monitoring system. The minimum shoulder width will be 1.5m except from Brunswick Beach to Furry Creek where highway widening will not occur until after 2010. Previous corridor transportation studies of on multi-modal transportation options, including commuter ferry, passenger rail and expanded transit service generally concluded that other modes would not divert enough ridership from the highway to alleviate need for highway improvements. Primary objective of the project is improved safety, as well as to improve highway reliability and provide capacity improvements where required. The MoT normally considers four laning when Annual Average Daily Traffic (AADT) approaches 10,000. Current AADTs are near 14,000 between Horseshoe Bay and Squamish, over 20,000 in urban Squamish and approaching 8,000 between Squamish and Whistler.
Kevin McLane. Concern over adverse impacts to rock climbing at Murrin Pak, Chief and Malamute sites. Would like to see improved parking and pedestrian access	Uplands Recreation Impact Assessment Report is part of the Application. MoT intends to establish focus group for discussions between recreational interest groups, local governments, B.C. Parks and project team to allow for exchange of information, ensure project benefits from local knowledge of recreation community and allow solutions to impacts in a consultative manner.
Mel S. Drage. Requests a sound barrier since traffic volume has increased and will increase further through Brackendale. Use surplus rock and other materials to construct a berm on Cheekye Fan.	MoT has noise mitigation guidelines and a variety of mitigation measures are considered. A noise impact assessment for project indicates noise mitigation is not warranted under MOT guidelines, however project team will work with communities to identify and undertake practical mitigation measures.
A.J. Lowe, Squamish Mills Ltd. Prepared to take any excess surplus rock as riprap on the foreshore at the Dry Land Sort.	Most surplus rock will originate from Horseshoe Bay to Lions Bay and disposal will be the responsibility of the contractors. Names of the bidding contactors can be provided.

Comment/ Issue	Ministry of Transportation Response
PINECREST/BLACK TUSK	
Brent Harley**.** Safety of access/egress from Pinecrest and Black Tusk subdivisions. Noise issues. Risk of contamination of local water supply from Retta Lake from exhaust pollution or spills and accidents. Move alignment significantly to east over an environmentally less sensitive and shorter stretch of land. Question whether MoT will seriously consider this option.	Number one objective of this project is to improve highway safety along the corridor. Current plans include protected T intersections at Pinecrest Estates and Black Tusk Village to allow vehicles to merge safely. MoT recognizes community drinking water source at Retta Lake is an important issue with the community. Current design provides for improvements by: lowering highway grade through this area to provide additional protection from highway splash and snow ploughing; keeping highway widening to the east side of the existing alignment; ensuring the pavement drains away from the lake, and providing an enclosed water collection system for highway drainage. Project team will continue to work with community to address concerns and mitigate impacts. ***EAO Note: The MoT has committed to place*** *concrete roadside barriers on the highway in the vicinity of Retta Lake to reduce the risk of vehicles entering the lake and minimize and control, rock blasting in the vicinity of Retta Lake. (OCR 10.7 and 10.8)*
Bryce Leigh. Proposed alignment from just east of Daisy Lake past Pinecrest and Black Tusk Village to Brew Creek Lodge Road will not adequately protect residents from increased noise or provide safe highway access. Prefer a new route further east, closer to Daisy Lake. Concern about Sea to Sky Trail (**EAO Note**: The trail is not part of the project.)	Number one objective is improving safety along corridor. Protected T intersections at Pinecrest Estate and Black Tusk Village accesses will provide much safer access and egress. Baseline noise measurements were recorded in this community and projected noise levels calculated for both 2010 and 2025. Project team will continue to work with the communities to develop practical noise mitigation. Alternate alignment along the shore of Daisy Lake was suggested by Community Advisory Group. Multiple Account Evaluation recently completed and will be presented to the CAG. ***EAO Note****: The MoT reports that this was done.*
Richard Auer. Recommends an underpass to drive onto the highway from Black Tusk and Pinecrest rather than a smart light to have smoother traffic flow, better highway access and fewer accidents.	*Number one objective is to improve highway safety performance. Current concept to provide protected* T intersections with acceleration and deceleration lanes in the southbound direction, with left turn slots and acceleration lanes provided in the northbound direction. This will provide a considerable safety benefit over the current intersections. Grade-separated crossings of the highway at Pinecrest Estates/Black Tusk Village are not currently under consideration by the project team. Comparative analysis of three alignment options adjacent to two communities is complete and will be provided to CAG at earliest opportunity.
WHISTLER	
J. Horner – Place concrete divider along entire route to reduce accidents and improve safety	Current highway has an accident record exceeding provincial averages. The Project will reduce the frequency and severity accidents and bring them to levels below the provincial average. The ultimate design standard for the section between Horseshoe Bay and Squamish is four lane divided and median barrier will be provided in sections built to the ultimate standard. Other parts of this section of highway will be improved to an interim three lane standard, with one lane in each direction and continuous passing lanes, either in the northbound or southbound direction.
Bob Becker. How will access to highway be managed during Olympics for Whistler residents? Will rail use be eliminated during Olympics?	Current plans are to utilize the section between Brunswick Beach and Furry Creek for a southbound lane for highway traffic daily from 4:00 am to 4:00 pm. Rail freight service will occur on the tracks from 4:00 pm to 4:00 am. BC Rail's current plans are to operate a rail shuttle service between Whistler and the Callaghan Valley. Passenger rail service between Vancouver and Squamish was considered by the Olympic Bid Committee during their transportation planning processes.
Doug Bebb Designate highway "mountain highway" to improve safety in winter by enabling RCMP to deal with drivers who have marginal tires. Power and speed contribute to accidents in poor conditions	***EAO Note****: Point of Information. This is beyond the control of the MoT.*

Comment/ Issue	**Ministry of Transportation Response**
WHISTLER	
Elizabeth Looi. Construction and ski season may create traffic jams, impact commuters. Need good information on closures during construction period.	Strategy to minimize construction impacts includes construction scheduling, Traffic Management Plans and a public communications plan.
Marilyn McVey. Consider needs of commuters during highway construction and Olympics. Passenger train service would be preferred use of funds and better for environment.	Key objective is to undertake project with least possible impacts to the traveling public. Various studies of alternate modes of transportation were undertaken for Sea to Sky corridor. Commuter rail was not found to capture sufficient ridership to alleviate need for highway improvements.
PEMBERTON	
David Midgley. Could construction be accelerated by increased use of equipment to shorten duration of work?	Staging construction over six years can better mitigate negative impacts by reducing overlapping delays. Contractors are required to develop and adhere to Traffic Management Plans that includes construction staging plans, delay mitigation strategies and traffic safety procedures. Construction schedule will not be accelerated to avoid compromising agreed upon traffic delay regime. In considering cash flow, attempts to optimize early benefits to the public are done.
OTHER	
Crispin S. Guppy. An inventory of rare butterflies and dragonflies, and their habitat, should be conducted. Once specific locations and habitats have been identified and described, appropriate mitigation and/or compensation plans can be developed. (Follow-up comments: Public review is to identify issues not already addressed. COSEWIC does not do original research. For most species of butterflies and dragonflies the habitats are not correlated with typical ecosystem mapping. A field inventory is the only viable option for determining locations and populations of dragonflies and butterflies of conservation concern. Appropriate mitigation will be site and species specific. Qualified entomologists would be able to provide expertise.) (Quesnel)	Impact assessments on the subject species were not included in detailed work plan for the upland vegetation and wildlife impact assessment. Species at Risk Act provides legislation to protect rare and endangered species. COSEWIC will continue to research and provide reference species to be protected under the Act. MOT would appreciate comments on how their ecosystem mapping might help identify habitats where some of the listed species may occur, whether the scientific world knows enough about these species to make these habitat links and mitigation measures.
Jim Alix, BC Cycling Coalition. Create shoulders of minimum 1.5 metres width and preferred 2 metres width and use appropriate intersection designs to accommodate cyclists. Project is opportunity to promote cycling and encourage alternate mode of transportation and contribute to tourism and reduction of greenhouse gases. (Nanaimo)	Project team recognizes Sea to Sky Highway is increasingly becoming a recreational corridor. Would like to establish a focus group for discussions between recreational interest groups, local governments, B.C. Parks and project Team. BCCC invited to participate. Ultimate design standard for the project includes minimum 1.5m wide paved shoulders, which may be greater within urban areas and beside single lane sections.

Comment/ Issue	Ministry of Transportation Response

OTHER	
Otto Kamstra. Design for bicycle traffic along the Highway between Vancouver and Pemberton.	A paved shoulder width standard of 1.5m minimum has been adopted for project. Optional cycling routes will not generally be provided unless there are existing facilities. Pavement sweeping will continue to be performed by road and bridge maintenance corridor.
Troy Tyrell. Project impact to recreational hiking trails - specifically Cheakamus Canyon Trail.	A recreational consultant retained to assess potential project impacts to recreation, identify mitigation and enhancement opportunities. Strategies to minimize impacts and maintain the trail continuity will be done on short section of the trail that may be impacted by road widening.
K. Perrault. Trains not lanes, with bike racks.	Commuter rail is expensive and would only divert small percentage of ridership off of highway.
S. Enevoldsen – prefer train route to Whistler	Commuter rail was considered and analyzed in corridor studies. Generally the studies conclude that commuter rail service in a form that could be competitive with other modes of travel is expensive to implement and would still only divert a small percentage of ridership off of the highway.
Donald Rennie Double tracking rail instead of highway will move far greater numbers of people, in greater comfort and with far fewer injuries or fatalities. Concern about air quality.	Objectives are to improve safety, reliability and provide capacity improvements where most needed. Commuter rail was considered and analyzed but is expensive, and only divert a small percentage of ridership off highway. BC Rail line as a third lane during Olympics between Brunswick Beach and Furry Creek will not prohibit conventional rail from operating. An accident involving Olympic athletes would detract from the success of the Olympic Games, as would an accident involving staff or spectators. Safety improvements will reduce the risk of such an event occurring.
Christa Bortignon. Any plans to bury hydro and telephone lines to improve sight distances and provide better security and safety?	Decisions on utility routing, method of routing and other such issues are responsibility of the utility companies. MoT responsible to ensure vehicular safety provided with respect to pole locations, bracing, cross-overs and other parts of the utility plant.
Patrick Hill Where and when will BC Rail track be used as detour or extra lane? Are passenger ferries still being considered for the 2010 Games from downtown to Squamish? How will the Squamish Dock connect the Sea to Sky highway?	Similar improvements to the railway are being considered between Brunswick Beach and Furry Creek to provide a dedicated southbound lane for vehicular traffic during peak daily periods during the Winter Olympics. Passenger ferry service between downtown Vancouver and Squamish is an integral part of the transportation plan for the 2010 Winter Olympics. Bus service between Squamish and Whistler will be provided for people using the passenger ferry service. The one way travel time is 50 minutes. The Squamish Dock/ Sea to Sky Highway connection will be developed during the urban Squamish design. ***EAO Note****: The MOT no longer proposes to use the rail line as a detour route during Project construction.*
Ron Masters. Why Horseshoe Bay to Brunswick Beach section not designed to an expressway standard cross-section? Will eventual 4 lane alignment from Horseshoe Bay to Squamish be free-flow with grade separation?	Context Sensitive Design applies design techniques to influence drivers. One element is narrower lanes. A shoulder with of 1.5m in rural sections is considered adequate. Current project does not eliminate at-grade intersections, however accesses will be consolidated wherever possible and upgraded to improve safety. Not within current concept to provide free-flow corridor between Horseshoe Bay and Squamish.
Helen Henderson. Concern with graffiti on rock faces and impact on aesthetics. Supports use of reflectors to delineate lanes.	MoT has a graffiti removal program through road and bridge maintenance contracts. Suitable delineation of the highway will be provided.

Comment/ Issue	Ministry of Transportation Response
Better Environmentally Sound Transportation (BEST)	
Errors in the Traffic forecasts including future traffic levels, inconsistencies between TSi consultants report and EA Application calculations, need to include estimated population growth in the estimates, and absence in the application of any detailed analysis of operations phase traffic levels. Revisions to the Application should include an up-to-date calculation of traffic flow impacts associated with highway construction which incorporates increased traffic volumes associated with induced population growth.	In the TDM study by TSi Consultants, the estimated latent travel demand was based on a 4-lane highway from Horseshoe Bay to Squamish. The highway improvements currently proposed have been significantly scaled-back. The highway segment from Lions Bay to Furry Creek will remain as two lanes and the segment from Furry Creek to South Stawamus will be improved to three lanes. As such, the EA Application had adopted a lower latent demand of 2 percent due to the scale-back in project scope. The traffic forecast in the EA Application has included additional traffic growth generated by the population increase of 16 percent that will be induced by the STS Highway upgrade. As the residents of the STS corridor account for approximately 35 percent of the annual trips, the 16 percent increase in population levels in the corridor will generate a 5.5 percent increase in travel. The latent demand and the additional population generated by the STS Highway upgrading will result in a combined traffic increase of approximately 7.5 percent relative to the Base Case in the absence of the Project. This traffic increase is included in the forecasts for the scenario with upgrading of the STS Highway.
Estimate the impact of highway expansion on ambient concentrations of ground level ozone including background VOC and NO_x. Provide more precise modeling of future ambient concentrations of ground level ozone in the corridor. Forecast future emissions of ozone precursors from point and area sources. Identify major corridor emissions of specific VOCs with high ozone production potential, and a sensitivity analysis of future concentrations of ground level ozone base on estimates of future ambient summer temperatures.	The absence of ambient air quality monitoring data is not a limiting condition for assessing and estimating changes in ambient concentrations in an airshed or for a project. Dispersion models are often used as tools to assess change when monitoring is impractical or too expensive. The air quality assessment clearly shows that ambient concentrations are predicted to decrease in future years when compared with baseline data. Within the STS airshed, no proposed or publicly disclosed future projects that require EAO approvals were discovered that are associated with direct emissions to atmosphere from point or area sources that could cumulate with the Project impacts. As part of the air quality assessment, a search was conducted to identify other future projects or activities that might be highly likely to occur (not hypothetical).. Since emissions of point and area sources are not expected to change significantly in the future years, and they do make up a large amount of the sources, the ratio of NOx to VOC emissions is not expected to change. The emission decrease from vehicles would thus result in a slight reduction in the airshed. Ozone is not directly emitted from the project or vehicles travelling along the corridor. It is formed in the atmosphere through a complex process that involves different meteorological processes, natural and anthropogenic sources. Factors such as time of year, spatial extent, diurnal variations, correlation with other contaminants, meteorology, wind direction and speed, transboundary influences, forest fires, and stratospheric ozone can effect the local concentration of ozone at any given time.
Need to estimate the cumulative impacts of corridor emissions increases induced by highway expansion including the estimates of total air emissions associated with the project – corridor intra-urban vehicle emissions from visitors and induced population growth, and vehicle emissions from increased traffic in the GVRD.	Existing air shed emissions are characterized in Vol 2, Sec C, Section 5.1 of the Application. A number of mobile, point and area emission sources were identified that contribute to ambient air quality in the air shed. Ambient air quality monitoring at Squamish, Whistler, Langdale, and Horseshoe Bay for a variety of pollutants was used to characterize the current air quality in the air shed (Vol 2, Sec C, Section 4) including the current contributions from the Sea-to-Sky Highway. When assessing the potential air quality impacts from the proposed project, the 98th percentile concentration from these monitors was added to the maximum predicted modelled contribution from the highway. This represents a conservative approach to assessing contributions to cumulative air quality. When ambient concentrations were added to the predicted emissions from the highway for the baseline and in future years (See Vol C, Sec C, Section 8.1, Table 8-1), the resulting concentrations remained below the applicable air quality objectives. By utilizing this approach (including monitoring data from the GVRD), potential air quality impacts from other sources in the corridor are addressed within the assessment.

Comment/ Issue	Ministry of Transportation Response
Better Environmentally Sound Transportation (BEST) Comments	
Provide an accurate estimate of greenhouse gas emissions associated with the project, including corridor intra-urban emissions and project related emissions n the GVRD.	Based on the increased traffic demand in the StS corridor in future years, the predicted GHGs will increase within the corridor as a result of the increase in demand and the method that is utilized to calculate GHGs. Vol 2, Sec C, Section 6, Table 6-2 shows the estimates of GHGs associated with the project. The estimates are based on Federal Government methodologies which include Natural Resources Canada fuel projections and Environment Canada emission factors.
The Application provides no concrete commitments to incorporate transit-oriented infrastructure in the project.	In the Preliminary Design of the highway segment from Horseshoe Bay to Lions Bay, discussions were held with West Vancouver Transit to determine their transit needs for the Lions Bay bus service. The identified needs of West Vancouver Transit, including bus stops/pullouts, have been incorporated into the Terms of Reference for the Design/Build Request for Proposal to be issued in 2004.
Operational phase (2010 -2025) – Social Impacts - Develop a peak period traffic flow model for the study area followed by calculation of traffic flow impacts generated by intra-urban traffic flows for Squamish and Whistler, as well as peak period flows into and out of the GVRD.	As stated in the EA Application, the incremental traffic generated by the Project that will enter the GVRD is between 1,000 and 1,500 vehicles per day by 2025. The higher end of the range represents the incremental traffic for a summer or winter weekend day and the lower end of the range represents the incremental traffic for a weekday morning or afternoon. For a weekday morning, which is a peak hour for traffic at the bridge crossings, the peak hour volume is estimated at 100 vehicles per hour (10%). The incremental traffic generated by the Project will add approximately 23 vehicles to each Burrard Inlet crossing in the peak direction during the morning peak hour, which is less than one percent of the bridge crossing traffic.
Traffic levels and travel times estimated for a highway expansion scenario should be compared not just to a "do nothing" scenario but to a scenario involving an aggressive program of transportation demand management and provision of a comprehensive suite of alternative transportation services. Additional information, where ever possible, on comparisons between outcomes obtained from the highway expansion scenario and outcomes obtained from implementation of alternatives, rather than outcomes obtained from passive "do nothing" scenarios.	The purpose of the Socio-community/Economic Assessment is to provide an objective evaluation of the positive and negative social and economic impacts of the Project, particularly impacts to communities that are dependant on the STS Highway for road transport. Accordingly, Project impacts were measured relative to the current and anticipated situation in the absence of the Project so that incremental impacts of the Project on the corridor communities could be established. Although, the intent was to present the Project on its own and in relation to the existing conditions rather than compare it to other travel modes, the MoT has extensively studied alternative travel modes. The STS Travel Demand study evaluated multi-modal scenarios (marine, rail and bus scenarios) on their ability to meet the travel needs of the corridor. The TDM study indicated that multi-modal scenarios do not appear to divert significant demand from Highway 99 and that coordinated implementation of TDM and supporting supply measures could reduce vehicle travel in the corridor by as much as 10 percent.
Complete an assessment of potential conflicts with the GVRD's Livable Region Strategic Plan (LRSP) and Whistler's Transportation Plan and ways in which these conflicts can be mitigated.	The population forecasts presented in Section 9.10 of the Socio-Community/Economic Assessment are for the GVRD and have been derived from the Livable Region Strategic Plan. These projections do not include communities outside of the GVRD. Most of the increased population growth along the Corridor will occur near the mid-point of the Corridor (Squamish, Britannia and Furry Creek). While some of this population will undoubtedly travel to the GVRD for employment, education and other reasons, this is not expected to have a significant impact on traffic levels in the GVRD (particularly on the north side of Burrard Inlet. The Resort Municipality of Whistler and Tourism Whistler have previously noted concerns about potential increased travel times along the Corridor if the STS Highway is not improved. Whistler is a major destination for international travelers and any deterioration of the travel conditions (time, safety and reliability) could damage growth prospects for the community The community also recognize that while the STS Highway needs to be upgraded, traffic needs to be appropriately managed to minimize community impacts (including crowding or congestion). These latter issues are being addressed through the ongoing Whistler Resort Transportation Planning Study undertaken jointly by the Resort Municipality of Whistler and the Ministry of Transportation.

Comment/ Issue	Ministry of Transportation Response
Better Environmentally Sound Transportation (BEST) Comments	
Need for measurement of baseline noise levels at noise sensitive locations during periods of high traffic volumes, and revised forecasts of noise levels at these locations in the operations phase. MoT should commit to noise mitigation at any noise sensitive location where noise levels exceed 55 dBA.	The issue of weekday versus weekend and fall/spring versus summer/winter noise monitoring were addressed in a report prepared for the Lions Bay Community Advisory Group (CAG) dated October 13, 2003 as part of the Kelvin Grove to M Creek project with CH2M Hill. The report determined that based on maximum 75% variation in Hwy. 99 daily traffic volumes observed in 2001 just north of Horseshoe Bay from approximately 10,500 veh/d on midweek days in late fall to 18,400 veh/d on Sundays in August, the variation in daily average noise level, or Leq(24). would be 2.5 dBA. The annual average volume is about 13,500 vpd so that average traffic noise levels measured on a late fall midweek day would be expected to be about 1.1 dBA lower than the annual average noise level.
Public and Stakeholder Consultation Program did not address rationale for concluding the alternatives to highway expansion were not feasible such as substantive consideration to the use of a comprehensive range of small, medium and large scale alternative modes combined with aggressive us of TDM measures, rail and marine option or alternatives vs. cost recovery.	The Stakeholder consultations in October 2002 presented key findings on the main modal alternatives to the Project. Key results on costs and diversion potential of rail and ferry modes were presented to the stakeholders. The reports containing more detailed information on the modal alternatives and their evaluation were made available to the public through website posting. As well, there were informal contacts with interested parties and stakeholders.
Post-Construction Phase Impact Management Measures. The application presents no plans for the ongoing monitoring of highway related impacts on air quality (outside of road dust), congestion, accidents, pedestrian and bicycle access, wildlife/traffic conflicts or noise monitoring (after 1st year).	The Highway Safety Department of MoT compiles and maintains a database on collisions that covers all provincial highways. This database, called the Highway Accident System (HAS), contains over 15 fields of information to characterize collisions on provincial highways. The MoT will continue to compile and report on collision frequencies and severities along the STS Highway using the HAS. Follow-up noise monitoring will be conducted after construction completion to verify the accuracy of opening-day noise level predictions. Any significant discrepancy found in the opening day noise levels would then be applied to the ten-year levels to determine whether mitigation is in fact warranted, as per Technical Note 3 of the MoTH Highway Noise Impact Mitigation Policy, November 1993. A possible noise mitigation measure would be a low speed zone in noisier areas along the corridor.
Consideration of Cumulative Environmental Effects and the significance of the Effects of the project. There is the potential for there to be effects on air quality as a result of the project. Also mentioned BC Ambient Air Quality Objectives are currently under review, and future corridor ambient ground level ozone levels nor project related GHG emissions have not been adequately assessed.	As part of the air quality assessment, a search was conducted to identify other future projects or activities that must be highly likely to occur (not hypothetical). Within the STS airshed, no proposed or publicly disclosed future projects that require EAO approvals were discovered that are associated with direct emissions to atmosphere that could cumulate with the Project impacts. A number of regional developments and activities were identified that could potentially lead to vehicle emissions along the corridor in the future. The latent demand and the additional population generated by the STS Highway upgrading will result in a combined traffic increase of approximately 7.5 percent relative to the Base Case in the absence of the Project. In terms of the air quality assessment, the associated traffic increase was included in the forecasts of the StS Highway Scenarios for 2010 and 2025. Thus the potential impacts from foreseeable future projects were considered within the air quality assessment.
Clearly, corridor transportation planning should take place in the broader context of urban and regional land use planning and growth management, rather than vice versa. Highway expansion should be seen as a last resort after al other alternatives have been exhausted. Application should include an acknowledgement of the cumulative growth related impacts that highway expansion will have on the corridor and a detailed set of commitments for working with regional and local governments to mitigate these impacts.	The additional traffic generated by the STS Highway upgrading due the latent demand and induced population growth has been estimated and included in the traffic forecast of the EA Application (refer to clarification under Volume 3, Section A, Sub-section 8). An explicit consideration and quantification of the safety impacts of the highway design was conducted. The results of the analysis indicates that the proposed highway improvements will substantially reduce the collision frequency as compared to the Base Case, as documented in the Highway 99 North: Safety and Design Consistency Analysis report. Analysis of traffic operations indicate the proposed highway upgrading will improve traffic operations along sections of the highway where additional lanes will be provided as compared to the Base Case in the absence of improvements.

Comment/ Issue	Ministry of Transportation Response	
Better Environmentally Sound Transportation (BEST) Comments		
Recommend that a more thorough evaluation of the potential for alternatives to delay, reduce or eliminate the need for highway expansion. Six alternative options mentioned (see below). Develop a research program to enable a more thorough evaluation of potential demand for alternative modes that includes collecting baseline data on corridor travel and conducting a comprehensive study of potential demand for alternative modes in the corridor including surveys, estimate demand, measure demands vs. cost, customizing market research to address different users,, measure demand for small and medium sized alternatives, transportation demand measures, and evaluate all options.	The STS Corridor Travel Demand study examined four multi-modal scenarios, with each scenario consisting of improvements to the highway and rail system. It is common practice to group combinations of improvements when evaluating strategic alternatives. This study does not represent a benefit-cost analysis of individual modal alternatives; however, Exhibit 5.19 of the Study provides an estimate of the average cost per trip for each modal alternative based on the mode-specific capital and operating costs. A Transportation Demand Management study has been undertaken for inter-city travel in the Sea to Sky corridor (Sea to Sky TDM Study by TSi Consultants). A wide range of TDM measures were examined and deemed to be applicable to the corridor, including parking pricing and supply management, parking priority, strengthened conventional inter-urban transit, combined transit/recreational pass, promotion of a sustainable resort, new premium transit, new marine service, park and ride lots, bike trailers/racks on buses. The study analysis indicates that coordinated implementation of TDM and supporting supply measures could reduce vehicle travel in the corridor by as much as 10 percent. This is consistent with TDM targets established in many urban settings. However, the proposed STS Highway upgrading would still be required even with a 10 percent reduction in traffic, particularly safety and reliability improvements.	

TABLE 1

OWNER'S COMMITMENTS AND RESPONSIBILITIES
SEA-TO-SKY HIGHWAY IMPROVEMENT PROJECT

NO.	COMMITMENTS AND RESPONSIBILITIES Note: These commitments apply to on-site, off-site, permanent, temporary and ancillary works and activities. "Site" refers to highway right-of-way as it may exist from time to time.	ACTION BY Note: this is for information purposes only and is not a binding part of the Certificate. Where ticks are not provided, whoever is doing the work has the obligation for the action.		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
1.	***General***				
	The Ministry of Transportation (MoT) will mitigate the potential impacts to the environment by:				
1.1	Providing one month advance notice to the environmental agencies that an item(s) subject to agency review will be provided for review.		✓	All stages	✓
1.2	Developing an Environmental Management Plan prior to construction start-up, in accordance with or equivalent to the provisions of Section 165 of MoT's *Standard Specifications for Highway Construction (hereafter referred to as Section 165)*, to convey an understanding of the project's environmental constraints (including construction timing) and how the Project will be undertaken to avoid/mitigate negative impacts. The Environmental Management Plan(s) (EMP) will be submitted to the appropriate environmental agency for acceptance before work commences and will include, as relevant, an: – Air Quality Monitoring and Mitigation Plan, – Archaeology and CMT Management Plan, – Raptor/Heron Management Plan, – Bear/Human Conflict Reduction Plan, – Construction Schedule pertaining to permits and approvals, environmental tasks, environmental timing windows and work restrictions, – Contaminated Soils Management Plan, – Environmental Quality Management Plan, – Environmentally Sensitive Areas Management and Protection Plan, – Environmental Training Plan, – Equipment and Materials Plan, – Fisheries Mitigation/Compensation Plan (including habitat balance calculations and monitoring), – Infrastructure Demolition Management Plan, – Materials Management Plan, – Noise Control and Mitigation Plan, – Potentially Acid Generating/Metal Leaching Materials and Acid Rock Drainage Adaptive Management Plan, – Riparian Restoration and Terrestrial Reclamation/Revegetation Plan, – Sensitive Ecosystem Management Plan, – Sediment and Drainage Management Plan, – Soil Conservation/ Stripped Organic Material Management Plan, – Spill Contingency and Response Plan, – Tailed Frog Management Plan, – Vegetation Debris Management Plan,		✓	Post contract award / Pre-construction	✓

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
1.2 cont'd	– Waste Management Plan – Water Quality Sampling Program, and – Wildlife Mitigation Plan. Revisions to plans will be required as changes in work scheduling, site conditions and weather occur.				
1.3	Consulting with environmental agencies to determine the conditions under which work in Environmentally Sensitive Areas (as defined in Section 165) must be carried out.		✓	Post contract award / Pre-construction	✓
1.4	Conducting on-site investigations and examinations of documents supplied and referenced by the MoT in order to fully comprehend the environmental aspects of the work required.		✓	Pre-construction/ Construction	
1.5	Producing an Environmentally Sensitive Area Management and Protection Plan for any work in and around Environmentally Sensitive Areas (as defined in Section 165), such as fish habitat. The environmental procedures will contain the following items: – Existing environmental conditions. Identification of the environmental resources (e.g. fish species and habitat) in the area of the proposed work. – Description of work proposed in the Environmentally Sensitive Area. Summary of the proposed work, equipment to be used, schedule of activities, and location. – Environmental protection measures. Statement concerning the measures that will be used to protect environmental resources (e.g., species and habitat) from each potential adverse impact. – Contingency plan. Description of alternative or backup plan in the event of an environmental emergency or failure of any of the protective measures. – Environmental monitoring requirements. Indication of any specific or unique environmental monitoring requirements to ensure compliance with environmental specifications and proper implementation of the environmental procedures.		✓	Post contract award / Pre-construction	✓
1.6	Retaining an environmental monitor to work on-site during all phases of highway construction. The monitor will work with the Contractor to ensure the protection of the environment, that mitigation measures are appropriately implemented and to facilitate communication between the Contractor, environmental agencies, and MoT.		✓	Construction	
1.7	Undertaking environmental quality audits to ensure the Contractor complies with the Environmental Management Plan.	✓		All Phases	
1.8	Providing documented demolition procedures and schedules in the Infrastructure Demolition Management Plan, and liaising closely with environmental agencies to ensure a full understanding of the site-specific environmental issues.		✓	Construction	

May 18, 2004

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
2.	***Potentially Acid Generating (PAG)-Material Management and Metal Leachate Loading at Final Rock Cut Faces*** *MoT will mitigate the potential impacts to biological receptors from acid generating materials by:*				
2.1	Detailed characterization of acid rock drainage/metals leaching in andesitic rock between Sunset Beach and 'M' Creek has identified PAG materials in four proposed rock cuts. These results will be used in conjunction with ongoing studies at the Britannia Mine to determine the appropriate handling and disposal options for this material, in consultation with the Ministry of Water Land and Air Protection and Ministry of Energy and Mines.			Pre-construction	✓
2.2	Optimizing the preliminary highway alignments to minimize rock excavation in areas where the potential exists for acid generating material.		✓	Post contract award / Pre-construction	
2.3	Using best management practices to avoid impacts from ML/ARD from material handling, stockpiling, transportation and placement of stockpiled materials during the construction phase.		✓	Construction	
2.4	Ensuring a properly qualified person or persons are retained for the terms of reference, methodology and products of subsequent metal leachate/ acid rock drainage assessments and mitigation work.	✓		Pre-construction	
2.5	Conducting the proposed detailed risk assessment during detailed design to identify if physical pathways exist and to evaluate the sensitivity of receptors to aluminum and copper toxicity.		✓	Pre-construction	MEM
2.6	Conducting a surface water monitoring program immediately prior to, during and post-construction for the sensitive waterbodies and any ditches at the base of the rock cuts if physical pathways are shown to exist to these water bodies that contain sensitive aquatic organisms (based on the risk assessment).		✓	Pre-construction/ Construction/ Post-construction	MEM
2.7	Maintaining a comprehensive database of all geological and geochemical data collected for the Sea-to-Sky Highway, including the rock units, sample type, location and results, drainage monitoring locations and results, and maps showing the sampling locations, rock types and ARD potential at planned excavation sites. This information will be provided in all tendering documents, and noted in all as-built plans as a guide for those conducting future highway maintenance and expansion. The database and plans will be updated when additional information is collected.		✓	Pre-construction	MEM
2.8	Referring the Potentially Acid Generating/Metal Leaching Materials and Acid Rock Drainage Adaptive Management Plan and the Materials Management Plan to environmental agencies for review and acceptance.		✓	Pre-construction	MEM

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
2.9	Retaining a qualified consultant to monitor material characteristics during construction to confirm assessments and to identify any materials with the potential for ML/ARD that were missed in the planning stages. The contractor will follow approved material disposal strategies and where necessary, recommend specific mitigative strategies to address unexpected conditions encountered during construction. If such areas are discovered, material handling options will be discussed with the Ministry of Energy and Mines		✓	Construction	MEM
2.10	Not used.				
2.11	Stipulating in contract language that acid generating (AG) and potentially acid generating (PAG) rock shall not be incorporated into embankment fills or elsewhere in the construction works, nor are they to be wasted other than in approved permitted disposal sites at: Watts Point offshore marine disposal area (PAG rock only), Point Grey offshore marine disposal area (PAG rock only); Britannia Mine Jane Basin glory hole (AG & PAG rock) and commercial disposal sites.	✓		Pre-construction	MEM
2.12	Stipulating in contract language that segregation of PAG and non-PAG materials within rock cuts will not be attempted unless it can be done without the potential for contaminating non-PAG materials with those with the potential for ML/ARD	✓		Pre-construction	MEM
2.13	Taking a proactive approach to designing and implementing measures that will mitigate potential for acid rock drainage and metals leaching from rock cuts. Measures may include: – shotcreting rock slopes or otherwise minimizing the infiltration of surface water through PAG/ML materials, – diverting surface water or otherwise minimising the volume of water that is in contact with PAG/ML materials, – designing ditches that will enhance dilution of acidic or metal contaminated drainage, – prevention of sensitive species from exposure to acidic drainage or metal leaching from rock cuts, – treatment of acidic or metal contaminated water prior to discharge to creeks.		✓	Post contract award / Pre-construction	
2.14	Developing monitoring and maintenance provisions to ensure long-term performance of mitigation works.		✓	Construction	MEM
2.15	Applying for a *"Disposal at Sea Permit"* in accordance with the Regulations Respecting Applications for Permits for Disposal at Sea.			Construction	EC
2.16	Applying for permits from MWLAP and MEM for disposal of PAG/AG materials at the Britannia mine site.			Construction	WLAP, MEM
2.17	Encapsulating acid generating material in a bulk fill or waste rock pile and treating any groundwater leachate generated from within it if the results of additional testing on the Squamish to Whistler section indicate acid generation. Detailed testing of the Greenstone rock immediately west of Daisy Lake has shown these rocks to be non-PAG.		✓	Construction	✓
2.18	Monitoring and treating any groundwater leachate if acid generating materials are encapsulated in bulk fill or waste rock piles on the Squamish to Whistler section until water quality standards are met.		✓	Post-construction	✓

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
3.	***Contaminated Soils*** *MoT will mitigate the potential impacts by:*				
3.1	Specifying in the contract documents that fills /soils should be placed directly over the existing materials at the Britannia Beach site, so that, if possible, only minimal disturbance takes place.	✓		Pre-construction	
3.2	Obtaining a Soil Relocation Agreement from the Ministry of Water, Land and Air Protection to ensure that any soils at Britannia Beach site that require relocation can be dealt with safely. Soils will be retained within the affected area of Britannia Mine operations.		✓	Pre-construction	✓
3.3	Ensuring that construction activities do not compromise the Britannia Mines remediation efforts.		✓	Pre-construction	✓
3.4	Should highway construction proceed within the area affected by the Gonzales Creek Hydrocarbon Spill site, coordinating the design team and Levelton Engineering Ltd. (who are managing the site for Scamp Industries) and Hemmera Environmental (who are managing the site for Interfor, owners of the property on which the spill occurred) to ensure the remediation is done prior to construction.	✓		Pre-construction	
3.5	Developing a Soil Relocation Agreement with the Ministry of Water, Land and Air Protection for the removal and transport of any contaminated soils as required.		✓	Pre-construction	✓
3.6	Specifying in the contract documents the requirement for the Contractor to develop a Contaminated Soils Management Plan (see item 1.2).	✓		Pre-construction	✓

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
4.	***Terrestrial Environment and Wildlife*** *MoT will mitigate the potential impacts to wildlife, migratory birds and biodiversity by:*				
4.1	Specifying in the contract documents the requirement that the Wildlife Mitigation Plan include measures to limit light pollution and measures to manage wildlife/human interactions.	✓		Pre-construction	✓
4.2	Specifying in the contract documents the requirement that the Sensitive Ecosystems Management Plan include measures to minimize the loss of and mitigate potential impacts to red- and blue-listed plant communities, dry arbutus habitat, and sensitive components of ecosystems, in accordance with management recommendations in **Volume 2 Section A: Wildlife and Vegetation**. This Plan will include: a survey of sensitive ecosystem polygons that are within proposed clearing and grubbing lines to determine if the sensitive ecosystem component is at risk; measures to delineate buffers around sensitive ecosystem components; measures to control the introduction of invasive and non-native species; and water quality protection measures. This plan will be submitted for environmental agency acceptance before work commences.	✓		Pre-construction	✓
4.3	Conducting pre-construction raptor (bald eagle, osprey, peregrine falcon) and heron nest surveys following RISC standards to determine the status (active or inactive) of previously recorded nests as well as any new active nests and their location.		✓	Pre-construction	WLAP
4.4	Retaining and protecting raptor and heron nests and roost trees where possible and applying for a permit under the *Wildlife Act* if a nest can not be retained.		✓	Construction	WLAP
4.5	Specifying in the contract documents that: a) no clearing of vegetation is permitted during the general bird breeding time period of March 15 to July 31 unless pre-approved by Canadian Wildlife Service on the basis of review of nest survey information collected by the Contractor at the time; b) no clearing is to occur within 500 metres and no blasting is to occur within 1 km of an active bald eagle, osprey, peregrine falcon, or heron nest between the January 31 to August 15 period unless otherwise pre-approved by Canadian Wildlife Service and the Ministry of Water, Land and Air Protection on the basis of review of nest survey information collected by the Contractor at the time; c) if blasting is to occur within 1 km of the heron colony on the banks of the Mamquam Blind Channel at IR24, then the blasting shall occur outside of the January 31 to August 15 period unless otherwise pre-approved by Canadian Wildlife Service; d) if construction of the BC Rail detour proceeds at Porteau Cove or barge loading sites are constructed and operated, waterbirds in the vicinity shall be monitored to ensure foraging/loafing waterbirds are not displaced and work practices shall be adjusted to minimize disturbance; e) where amphibian habitat is directly affected, effort shall be made to isolate the area, then salvage and relocate the amphibians prior to any site disturbance; f) where roadside rock piles and talus habitat is removed in the Daisy Lake area, rock piles shall be created to an equivalent extent using rock fill of a diameter suitable for reptiles.	✓		Pre-construction	WLAP, CWS

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
4.6	Conducting pre-construction surveys of spotted owls following RISC standards. Continuing to consult with the environmental agencies regarding requirements for spotted owl surveys and developing an inventory program for areas where disturbances overlap high and moderate habitat suitability/capability ratings for this species.		✓	Pre-construction	✓
4.7	Retaining a wildlife biologist to monitor trees with nesting potential for marbled murrelet on the east side of Doodson Corner, Polygon 899, and if required, developing in consultation with environmental agencies, mitigative measures to minimize or off-set losses of nesting habitat as a result of clearing of trees in this area.		✓	Pre-construction	✓
4.8	Include on applicable construction drawings all critical and sensitive wildlife habitats and ecosystems (e.g., nest trees, red- and blue-listed plant communities, wetlands, etc.) as identified in **Volume 2 Section A: Wildlife and Vegetation** and supplemental documents.		✓	Pre-construction	✓
4.9	Include on applicable construction drawings "no disturbance" riparian and "vegetation to remain" (protected vegetation) areas. Areas of protected vegetation will include those areas that provide a vegetated buffer from outside disturbance to sensitive ecosystem components, including red- and blue-listed plant communities, as identified in **Volume 2 Section A: Wildlife and Vegetation** and supplemental documents.		✓	Post contract award / Pre-construction	✓
4.10	Minimizing the width of the cleared edge beside the highway, while meeting the driver sight distance and project safety requirements to reduce the opportunities for vegetation that is attractive to wildlife to become established and to minimize the amount of habitat lost and/or altered.		✓	Pre-construction	
4.11	Developing terrestrial revegetation plans, in consultation with environmental agencies, that utilize native plant species that are appropriate to the site and coarse woody debris for amphibian and reptile habitat creation.		✓	Pre-construction	✓
4.12	Developing, in consultation with the environmental agencies, mitigative measures to limit wildlife mortality associated with vehicle collisions. Measures might include culvert or bridge design refinements to accommodate wildlife passage, identification of locations for wildlife signs, and specifying that concrete roadside barriers have enlarged scuppers (holes) to facilitate small animal passage. Special attention will be paid to developing mitigation measures for off-alignment construction segments (e.g. Horseshoe Bay).		✓	Pre-construction	✓
4.13	Complying with the 2,000 m no fly-zone around mountain goat winter range.		✓	Pre-construction Construction	
4.14	Reducing the area of impacted sensitive plant communities and developing, in consultation with the environmental agencies, a compensation plan for the potential loss of dry arbutus dominated habitat in the Horseshoe Bay area and the loss of areas of red- and blue-listed plant communities at a replacement ratio of 1:1. This compensation could take the form of the adjustment of BC Parks boundaries to encompass the sensitive ecosystem; adding a Restrictive Covenant to a land title if the property owner is willing to be a signatory to the covenant; and/or transfer of the title to a conservation group.	✓		Pre-construction	✓

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
4.15	Developing, in consultation with the environmental agencies, wildlife habitat features at the proposed fisheries compensation sites, for example the creation of amphibian habitat at the Callaghan Creek Tributary Wetland Complex. Compensation for wildlife habitat loss will be developed in association with aquatic compensation requirements to ensure development of a comprehensive compensation strategy.		✓	Pre-construction	✓
4.16	Demarcating "no disturbance" and "vegetation to remain" areas in the field before clearing and grubbing begins.		✓	Construction	
4.17	Not used.				
4.18	Not used.				
4.19	Ensuring that the Contractor comply with the contract documents with respect to critical bird breeding time periods and related clearing restrictions, including construction timing and location restrictions in the vicinity of active raptor and heron nests.	✓		Construction	
4.20	Revegetating and protecting all exposed soils from erosion in accordance with, or using means equivalent to, MoT's *Manual of Control of Erosion and Shallow Slope Movement*, 1997. Hydroseed mixes for use along the highway will serve the primary function of successful erosion control, and to the extent possible, will exclude species that are palatable or attractive to wildlife		✓	Construction	
4.21	Requiring the Contractor to implement the approved "Bear/Human Conflict Reduction Plan" and "Wildlife Mitigation Plan".	✓		Construction	
4.22	Mitigating for impacts from ancillary areas by: — minimizing the losses of the largest (>60 years old) trees when laying out tote roads; — restoring all tote roads and equipment storage and marshalling sites as soon as they are no longer in use; and — reclaiming and revegetating depleted or inactive gravel and granular borrow pits in a manner consistent with, or using means equivalent to, MoT's *Reclamation and Environmental Protection Handbook for Sand, Gravel and Quarry Operations in British Columbia* (1995). To meet or exceed the requirements, all machinery, equipment and structures associated with the pits will be removed; watercourses will be reclaimed as close to their original position as possible; side slopes of sand and gravel pits will be recontoured to 2 horizontal: 1 vertical or flatter; and self-sustaining native plant cover will be re-established.		✓	Construction	
4.23	Requiring that operational activities be carried out in accordance with, or using means equivalent to, applicable Ministry policies and procedures, including: — MoT's *Maintenance Specifications*, in order to prevent immediate or delayed environmental impacts to wildlife habitat. The maintenance contractor's responsibilities include, but are not limited to: agency notification; properly maintaining drainage patterns; exercising sediment and erosion control; controlling dust; and carrying out emergency maintenance; and — MoT's *Emergency Response Plan* which outlines what actions maintenance contractors and Ministry Area Managers must take in the event of a hazardous spill.	✓		Post-construction	

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
4.24	Installing bear proof garbage containers at popular pullouts and any proposed safety rest areas.		✓	Post-construction	
4.25	Requiring maintenance contractors immediately clean-up any spills that involve foods that are attractive to wildlife.	✓		Post-construction	
4.26	Wherever possible, refraining from utilizing herbicides or pesticides along the corridor during construction or maintenance. Where spot treatments of a herbicide are necessary, the MoT will consult with the Squamish and Lil'wat Nations regarding potential impacts and appropriate mitigation.		✓	Construction, Post Construction	
4.27	Consulting with the Lil'Wat Nation on the development and implementation of wildlife/habitat mitigation plans within their territory.	✓		Pre-construction, Construction	
4.28	If the overland option is selected at Horseshoe Bay, undertaking a windthrow prediction assessment within the Larson headwater swamp, and, if required, developing and implementing mitigation measures such as spiral thinning and feathering of forest edges.		✓	Pre-construction Construction	

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
5.	***Fisheries and Aquatic Habitat*** *MoT will mitigate the potential impact to stream and foreshore fisheries resources by:*				
5.1.	Include on applicable construction drawings all fish bearing streams and sensitive fish and amphibian habitats as identified in **Volume 2 Section B: Fisheries and Aquatic Habitat** and supplemental documents.		✓	Pre-construction	✓
5.2	Identifying "no disturbance" riparian and "vegetation to remain" (protected vegetation) areas in the construction drawing package and marking these area in the field		✓	Pre-construction	✓
5.3	Developing riparian restoration plans, in consultation with environmental agencies.		✓	Pre-construction	✓
5.4	Specifying in the contract documents that the Sediment and Drainage Management Plan must address, but not be limited to, areas of expected sedimentation.	✓		Pre-construction	✓
5.5	Preparing generic treatment schemes for areas and slopes of sedimentation potential (e.g., hydroseeding to cover exposed soils following construction) and developing site-specific treatment prescriptions for areas prone to shallow slope movement and detailed on drawings. The Sediment and Drainage Management Plan will be referred to environmental agencies for their review prior to soil disturbance.		✓	Pre-construction	✓
5.6	Providing fisheries window information in the contract documents so that it will be incorporated into the development of the Environmental Management Plan before the start of construction.	✓		Pre-construction	✓
5.7	Finalizing crossing structure designs on the basis of geotechnical and biological considerations and on-site discussions between consulting fisheries biologists and representatives of MoT, the Ministry of Water, Land and Air Protection and the Department of Fisheries and Oceans. The Squamish Nation will be involved in designs affecting the Stawamus River. Crossings will maintain natural drainage patterns, meet the Department of Fisheries and Oceans' requirements for water flow and fish passage, in accordance with, or using means equivalent to, the guidelines and best management practices presented in: – "Fact Sheet on Culverts and Fish Passage", a Ministry publication, – *Land Development Guidelines for the Protection of Aquatic Habitat*, a joint publication of the Ministry of Environment, Lands and Parks and the Department of Fisheries and Oceans, – *Interim Standards and Best Management Practices for Instream Works*, Ministry of Environment, Lands and Parks March 2003, and – Any updated best management practices that are developed during the project.		✓	Pre-construction	✓

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
5.8	Continuing to assess the proposed tunnel alignment option and, if the tunnel alignment option proceeds to final design, finalizing mitigative measures to minimize impacts to Nelson Creek (south portal) and the headwaters of Larsen Creek (north portal) in the short-term, and tunnel water run-off in the long term.	✓		Pre-construction	
5.9	Retaining a hydrologist to provide input tc the detailed design to protect hydrological function and water quality in the headwaters of Larsen Creek.		✓	Pre-construction	
5.10	Finalizing detail design on the basis of highway engineering, biological considerations and discussions between consulting fisheries biologists, engineering designers, the Ministry of Water, Land and Air Protection and the Department of Fisheries and Oceans (e.g., near the unnamed tributary to Brohm Creek and at Millar Creek).		✓	Pre-construction	✓
5.11a	Ensuring the continued application of DFO's preferred management options for the protection of fish habitat during detailed design.	✓			✓
5.11b	Identifying and implementing special measures to offset any impacts to amphibian habitats, in conjunction with fish habitat compensation works. Special measures might include the addition of marsh benches or woody debris. Key compensation sites being considered include the Mashiter Spawning Channel, the unnamed tributary to the Cheakamus River near SW 83, and the Callaghan Creek Tributary/wetland complex at SW 181 and SW 183.		✓	Pre-construction	✓
5.12	Identifying and implementing special measures, in consultation with the Ministry of Water, Land and Air Protection, to offset any impacts to tailed frogs. Special measures might include replacement of perched, closed culverts on important tailed frog streams with open bottom structures or installation of cobble and boulder ramps on tailed frog streams where existing culvert outlets are perched. The quality of the potentially tailed frog streams will be ranked and the most optimal sites, with the greatest resultant benefits for important tailed frog populations, will be enhanced.		✓	Pre-construction	✓
5.13	Finalizing the design of mitigation measures, in consultation with the environmental agencies.		✓	Pre-construction	✓
5.14	Installing an open bottom culvert at Middle Creek, unless a technical rationale that documents why a closed bottom structure is more acceptable at this location is developed and is accepted by the Ministry of Water, Land and Air Protection and Department of Fisheries and Oceans during the permitting/authorization phase.		✓	Pre-construction	✓
5.15	Mitigation measures will be applied to the final design of culvert extensions between Centennial Way and Depot Road.		✓	Pre-construction	

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NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
5.16	Finalizing fish habitat compensation plans to ensure the Department of Fisheries and Oceans' no-net-loss policy requirement is met prior to construction in a work segment. A fisheries biologist will be retained to complete compensation and monitoring plans, in consultation with design engineers and environmental agencies, at some of the following potential sites: – Larsen Creek (for both onsite and offsite compensation requirements); – Middle Creek; – lower Thistle Creek, in consultation with BC Rail, if the bypass option proceeds and Thistle Creek and its tributary are impacted; – the Mashiter Spawning Channel and culvert crossing; – Loggers Lane Creek; – at the two existing Mamquam Blind Channel culvert crossings (sample sites HS 110 and 111); – the Cheakamus River tributary at the decommissioned salt shed and sand storage site; – Callaghan Creek Tributary/wetland complex at SW 181 and SW183.		✓	Pre-construction	✓
5.17	Working with the Department of Fisheries and Oceans during the permitting/authorization phase towards the installation of an acceptable crossing structure design at the Mashiter Spawning Channel, with the invert of the new structure to be lower than the existing culvert to improve the likelihood of success for any future restoration activities that would be taken to address inadequate groundwater supplies.		✓	Pre-construction	✓
5.18	Liaise with Land & Water BC Inc. on its requirements for *Land Act* and *Water Act* approvals. This is particularly in relation to works in and about streams and other fresh water bodies that could be affected by construction activities (bridges, pillars, pilings, fill etc.).		✓	Pre-construction	LWBC
5.19	Finalized compensation plans will avoid conversion of higher value or critical upland habitats into instream or riparian habitats when unacceptable to regulatory agencies. Wildlife habitat considerations (e.g., wildlife habitat feature protection or creation measures) will be incorporated into compensation plans.		✓	Pre-construction	✓
5.20	Marking "no disturbance" riparian and "vegetation to remain" areas in the field before clearing and grubbing begins. All cleared material will be kept out of wetland areas, streams and the foreshore, and where possible, riparian vegetation that does not pose a hazard to the highway will be left intact.		✓	Construction	✓
5.21	Complying with MoT's *Standard Specifications for Highway Construction* or equivalent contract document, to ensure that unstable areas are not created during construction, to ensure proper work practices regarding the transport, handling, storage and use of deleterious/hazardous materials and to protect fish-bearing waters from potential malfunctions or accidents during the construction phase.		✓	Construction	

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
5.22	Restoring riparian areas by planting appropriate native species following Ministry of Water, Land and Air Protection/ Department of Fisheries and Oceans criteria.		✓	Construction	✓
5.23	Revegetating and protecting all exposed soils from erosion in accordance with, or using means equivalent to, the Ministry's *Manual of Control of Erosion and Shallow Slope Movement*, 1997.		✓	Construction	
5.24	Installing, as required, riprap splash pads or discharge aprons at ditched outlets to protect against ditch slope erosion and the creation of new plunge pools.		✓	Construction	
5.25	Implementing and monitoring the compensation plans approved by the Department of Fisheries and Oceans under Authorization.		✓	Construction	✓
5.26	Mitigating for impacts from ancillary disturbance areas by: – restoring all tote roads and equipment storage and marshalling sites as soon as they are no longer in use; and – reclaiming and revegetating depleted or inactive gravel and granular borrow pits in a manner consistent with, or using means equivalent to, MoT's *Reclamation and Environmental Protection Handbook for Sand, Gravel and Quarry Operations in British Columbia* (1995). To meet or exceed the requirements, all machinery, equipment and structures associated with the pits will be removed; watercourses will be reclaimed as close to their original position as possible; side slopes of sand and gravel pits will be recontoured to 2 horizontal: 1 vertical or flatter; and self-sustaining native plant cover will be re-established.		✓	Construction	
5.27	Retaining a fisheries biologist to monitor the post-construction success of the stream compensation sites in accordance with the terms and conditions of the Department of Fisheries and Oceans Authorizations.		✓	Post-construction	✓
5.28	Requiring that operational activities be carried out in accordance with, or using means equivalent to, applicable ministry policies and procedures, including: – MoT's *Maintenance Specifications*, in order to prevent immediate or delayed environmental impacts to wildlife habitat. The maintenance contractor's responsibilities include, but are not limited to: agency notification; properly maintaining drainage patterns; exercising sediment and erosion control; controlling dust; and carrying out emergency maintenance; and – MoT's *Emergency Response Plan* which outlines what actions maintenance contractors and Ministry Area Managers must take in the event of a hazardous spill.	✓		Post-construction	

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
5.29	Requiring that the contractor conduct regular inspections during operations so that potential problems, including erosion and slope instabilities, are recognized early and site-specific treatments developed and implemented.	✓		Post-construction	
5.30	Continuing to consult with the Squamish Nation in relation to stream and habitat mitigation/consultation measures regarding the following areas of importance for fishing and hunting activities by Squamish Nation members: – Stawamus River, – Mamquam River, – Mamquam Blind Channel, – Larsen Creek, and – Brohm River.				
5.31	Consulting with the Lil'Wat Nation on the development and implementation of the fisheries mitigation plans within their territory				
5.32	Avoiding encroachment to the wetted area of the swamp habitat in the Larsen Creek headwaters through horizontal adjustments to the alignment or mitigating impacts through design features, such as retaining walls. MoT's intention is to apply DFO's hierarchy of preferences at preliminary design and to first try to relocate, then redesign, then mitigate the potential impact.		✓	Pre-construction	✓

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
6.	***Air Quality*** *MoT will mitigate the potential impacts to air quality by:*				
6.1	Implementing site specific pollution prevention measures and best management practices to minimize the generation of road dust and particulate matter. These measures include: – develop, in consultation with stakeholders, a Vegetation Debris Management Plan for clearing and grubbing activities, – as much as possible, remove and fill material "in one trip" to minimize the handling of material on stockpiles and during transfer to and from construction equipment, – minimize the time unpaved surfaces are exposed and frequently water unpaved and hauling surfaces to minimize road dust, – ensure soil piles are watered on dry days, cover small soil piles and vegetate longer-term soil piles to minimize dust, – cover haul/dump truck loads of fine-grained materials during longer distance hauls, and – ensure effective management of ambient air quality impacts when construction activities take place near residences located within 50m of the road (e.g., Lions Bay, near Squamish, Stawamus IR#24) by monitoring PM_{10} and $PM_{2.5}$ during the driest days each season.		✓	Construction	
6.2	Developing and implementing the Air Quality Monitoring and Mitigation Plan.		✓		
6.3	Adhering to open burning enactments with regard to burning of vegetative debris. Where vegetative burning could impact nearby residences, monitoring on those days where ambient levels could already be elevated.		✓	Construction	
6.4	Cooperating with the Greater Vancouver Regional District (GVRD) and environmental agencies, as required, in the assessment of air quality data measured periodically by those agencies at Horseshoe Bay, Squamish and Whistler, and determine the resultant appropriate level of prevention management.		✓	Construction	✓
6.5	Managing road dust by cleaning the highway in compliance with, or using means equivalent to, MoT's maintenance specification.		✓	Post-construction	

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
7.	***Socio-Community/Economic Assessment*** *MoT will mitigate the potential impacts to local communities by:*				
7.1	Developing and implementing a traffic management plan to address potential traffic disruption during construction. Mitigation of traffic disruption is recognized as a key consideration and essential component in Project planning. Mitigation measures include, but are not limited to, scheduling of construction works to avoid times when traffic volumes are higher, including seasons, day-of-week and hours of the day.		✓	Pre-construction and construction	
7.2	Developing, in association with the Vancouver Coast Health Authority (VCHA), communications for residents and physicians about access to health care services in the Lower Mainland and related travel times. In particular: – working with VCHA to communicate with residents of affected areas and physicians to make patients aware of additional time required to travel to appointments. – working with VCHA, physicians, nurses and community resources to ensure that expectant parents are aware of possible delays in getting to hospital. – communicating schedule for delays or closures to Health Authority, clinicians and couriers so that clinic schedules, physician travel times and courier schedules may be adjusted.			Pre-construction	✓
7.3	Working cooperatively with the public, police, fire and ambulance service providers along the corridor to ensure effective emergency service by: – communicating with the public in communities affected by construction so that, when an emergency arises, they can factor construction delays into their decisions (e.g., where to go for care; whether to call an ambulance). – maintaining access to one highway lane for emergency vehicles to the extent possible. During blasting (when one lane can not be cleared quickly), ensure that helicopter transport is on standby. – working with the B.C. Ambulance Service (BCAS) to ensure access to helicopter services are available if required. Contractors may need to identify or develop potential helicopter landing sites. – developing communication protocol between construction site(s) and the B.C. Ambulance Service to ensure that ambulances are able to get to front of traffic queues during delays and temporary closures.			Construction	

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
7.3 cont'd	– developing communication protocol between construction site(s) and fire protection services dispatchers to ensure that fire protection services are able to get to the front of traffic queues during delays and that neighbouring fire protection services are able to access service areas during times of temporary closures. – developing a communications protocol between VCHA and BCAS to ensure dispatchers are aware of delays or closures. – working with the RCMP to map high frequent crash areas to construction areas so that the RCMP can identify in advance those high-incidence areas that require RCMP response and for which access may be restricted due to construction.				
7.4	Communicating closure/delay schedule to School Districts and school administrators.	✓		Construction	
7.5	Developing and implementing a pro-active overall communications strategy to coordinate construction work, communications and stakeholder dialogue. This will include liaison with First Nations, municipalities, businesses, Chambers of Commerce, and tourism associations about schedules for construction and special events and working with businesses to examine adjustments to work schedules during closure periods.	✓		Pre-construction and construction	
7.6	Establishing a project liaison office to coordinate consultations, communication and construction.	✓		Pre-construction and construction	
7.7	Encouraging bidders to propose programs for fostering local employment and local business opportunities.	✓		Construction	

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
8.	***Community Access*** *MoT will mitigate the potential impacts to community access by:*				
8.1	Consulting with municipalities, First Nations, and individuals requiring access to their properties during construction to devise plans to maintain necessary property access.	✓		Pre-construction	
8.2	Developing a communications strategy and working relationship with local businesses to address potential access issues during construction.	✓		Pre-construction	
8.3	Continuing to consult with the Project Technical Liaison Committee and work closely with key stakeholders, First Nations, and Community Advisory Groups to ensure that adverse impacts are identified and design features are developed to provide safe pedestrian, cyclist and vehicular movement to, from and across the Highway.	✓		Pre-construction	
8.4	Implementing detours in areas requiring by-pass routes around construction areas.		✓	Construction	
8.5	Providing directional signage along detours to notify motorists of the approaching communities and egress points.		✓	Construction	
8.6	Implementing effective safety measures on all detours, including but not limited to, as required, a posted speed limit, flag persons, train actuated gates, and pilot vehicles to lead vehicle platoons through the detour.		✓	Construction	
8.7	Highway design and access solutions on and through the Stawamus Reserve (IR#24) will be jointly identified and refined by the Squamish Nation and the MoT. The Squamish Nation will be notified if new road accesses are developed during the detailed design process.				

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
9.	***Noise***				
	MoT will mitigate the potential impacts from noise by:				
9.1	Keeping the community well informed of the nature and time limits of the planned construction work and of the effort to be made to control noise impacts.		✓	Pre-construction	
9.2	Holding meetings with representatives of the various municipalities affected to identify the noisiest construction activities that must be conducted within each community and to discuss the extent to which these activities can be conducted during normal daytime working hours. For those activities which must be done at night, the contractor will describe the measures which will be taken to minimize the noise produced and will discuss whether work can be scheduled during the first few evening hours rather than between midnight and 5:00 am.			Construction	
9.3	Specifying in the contract documents procedures the Contractor are to follow to minimize noise emissions and to communicate effectively with the affected communities.	✓		Pre-construction	
9.4	Reducing average noise levels in the noisier residential areas along the corridor (e.g., Lions Bay, IR 24 and urban Squamish) by specifying in contract documents the use of open graded asphalt that creates less tire noise.	✓		Pre-construction and construction	
9.5	Working with the Lions Bay community to reduce current highway noise by 4 to 5 dB through mitigation measures, such as open graded asphalt and speed reduction. Further, MoT is prepared to work with the community to make best efforts to incorporate noise barriers and other noise mitigation efforts where effective, which could result in a further 5dB reduction.			Pre-construction	
9.6	Working to reduce traffic speeds through the Village of Lions Bay, including consulting with the police and the RCMP to discuss ways in which MoT can facilitate more effective speed enforcement (e.g., additional pull outs for enforcement use).	✓		Pre-construction	
9.7	Undertaking additional analysis of the potential impact of highway noise within IR 24, in cooperation with the Squamish Nation, during the detailed design phase as the physical characteristics of the alignment become better known. In addition to the mitigative measures that have already been proposed (the use of open graded asphalt, traffic calming measures, etc.) MoT will consider other viable options in consultation with the Squamish Nation.		✓	Pre-construction	
9.8	Assessing, monitoring and, if necessary, mitigating the impacts of operational (traffic) noise at the daycare facility on the Squamish First Nation's IR #24 during the detailed design phase of the Urban Squamish section.		✓	Pre-construction Construction	
9.9	Assessing, monitoring and, if necessary, mitigating construction noise exposures at the Eagle Ridge School and the Stawamus Elementary School.		✓	Pre-construction Construction	

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
9.10	As part of the Noise Control and Mitigation Plan, determining the layout, nature and schedules of any affected daycare facilities, including the facilities at Lions Bay and on the Squamish First Nation's IR #24, to develop strategies that will limit project-related construction noise exposures during nap times.		✓	Construction	
9.11	Educating construction personnel about particular noise issues and associated equipment operation.		✓	Construction	
9.12	Avoiding or reducing construction noise at the source through the appropriate operation, modification or maintenance of construction equipment and processes.		✓	Construction	
9.13	Scheduling construction activities so the noisiest activities (e.g., rock drilling, pile driving) are conducted, to the extent possible, within the daytime construction period.		✓	Construction	
9.14	Requiring the Contractor to hold meetings with representatives of affected municipalities to discuss measures that the Contractor will take to minimize the noise produced or received in the community.	✓		Construction	
9.15	Requiring the Contractor adopt a Noise Control and Mitigation Plan to minimize the disturbance to adjacent residential enclaves and communities.	✓		Construction	✓
9.16	Requiring the Contractor to comply with contract documents to minimize construction noise.	✓		Construction	
9.17	Reducing average noise levels in the noisier residential areas along the corridor (e.g., Lions Bay, IR 24, and urban Squamish) by implementing traffic calming measures.		✓	Post-construction	
9.18	Begin conducting follow-up noise monitoring within one year of project completion to verify the accuracy of traffic noise projections and effectiveness of noise mitigation techniques.		✓	Post-construction	

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
10.	***Water Quality*** *MoT will mitigate the potential impacts to water quality by:*				
10.1	Implementing a three-component Water Quality Monitoring Program, including (1) water quality audit and performance monitoring, (2) water quality sampling and analysis of runoff from PAG/ML rock cuts, and (3) water quality field sampling monitoring protocol. (a) The water quality audit and performance monitoring program will include hydrocarbon and, oil and grease testing conducted on samples taken as part of stages 2, 3 and 4; if samples taken during stage 2 sampling do not indicate the presence of hydrocarbons in the surface waters, then random sampling may be implemented for stages 3 and 4. (b) The water quality field sampling monitoring program will include pH and conductivity.			Pre-construction / Construction	✓
10.2	Avoiding areas of unstable or erosion-prone terrain.		✓	Pre-construction	
10.3	Specifying in the contract documents that the Contractor must prepare a Sediment and Drainage Management Plan that identifies sensitive or potential problem areas and provide a strategy for dealing with them,including planned water control, sediment control, stormwater runoff controls and water quality testing programs.	✓		Pre-construction	✓
10.4a	Preparing generic treatment schemes for areas and slopes of sedimentation potential (e.g., hydroseeding to cover exposed soils following construction) and developing and detailing on drawings site-specific treatment prescriptions for areas prone to shallow slope movement.		✓		
10.4b	Requiring that the Contractor prepare a Spill Contingency and Response Plan for the clean-up of toxic or hazardous spills prior to construction and submit it, together with a list of spill abatement equipment, to be stored on the job site, to the Ministry representative for review.	✓		Pre-construction and construction	
10.4c	Requiring the Contractor to immediately report as required by law and verbally to the Ministry representative and the Provincial Emergency Program, any spill of any toxic or hazardous material. The Contractor must immediately take the necessary steps as required by law, including measures to abate the discharge and provide the necessary labour, equipment, materials and absorbents to contain and remove the spill, clean-up the affected area, dispose of waste materials at an approved disposal site, and restore the area to the satisfaction of the environmental regulatory agencies.	✓			
10.5	Compiling a list of groundwater well users whose wells are within 500 m of the proposed project works and testing of wells where permission is granted by the owner.	✓		Pre-construction	
10.6	Implementing a water quality audit and performance (trend) monitoring program prior to construction to establish the immediate pre-construction water chemistry of surface water streams, domestic wells and community water supplies.	✓		Pre-construction	✓

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
10.7	Placing concrete roadside barriers on the highway in the vicinity of Retta Lake to reduce the risk of vehicles entering the lake.		✓		
10.8	Minimizing and controlling rock blasting in the vicinity of Retta Lake.		✓		
10.9	Implementing the guidelines in, or using means equivalent to those outlined in, MoT's *Guidelines for Environmental Design of Highway Drainage*, 1992.		✓	Construction	
10.10	Implementing standard forms of erosion and siltation control, including but not limited to, silt fences, straw bale barriers, hydroseeding, diversions, sediment ponds.		✓	Construction	
10.11	Continuing the implementation of a water quality data collection program during construction to identify water quality issues. Water sampling will be done as close to "first flush" as possible.		✓	Construction	✓
10.12	Revegetating and protecting all exposed soils from erosion in accordance with, or using means equivalent to those outlined in, MoT's *Manual of Control of Erosion and Shallow Slope Movement*, 1997.		✓	Construction	
10.13	Requiring that the Contractor conduct regular inspections in compliance with, or using means equivalent to, the Ministry's maintenance specifications so that potential problems – including erosion and slope instabilities – can be identified early.	✓		Post-construction	
10.14	Implementing a water quality data collection program approximately 6 months after construction completion to ensure water quality guidelines are met. If water sampling indicates that excedences of drinking water or aquatic standards are occurring as a result of construction, MoT will direct the Contractor to alleviate the situation and further monitoring will be conducted until water quality standards are met.	✓		Post-construction	✓
10.15	Developing site-specific treatments (e.g., sodding, installing a permanent water quality treatment basin, applying bioengineering techniques or applying shotcrete), if required to further stabilize an area.		✓	Post-construction	✓

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
11.	***Recreation*** *MoT will mitigate the potential impacts to recreation resources by:*				
11.1	Continuing to consult with recreation industry and user representatives about issues that affect their interests, and ensure that, whenever feasible, adverse impacts are avoided or mitigated.	✓		Pre-construction	
11.2	Consulting with recreation user groups to discuss the potential for enhancement of recreation sites.	✓		Pre-construction	
11.3	Developing a communications strategy specific to recreation users to discuss design and site-specific construction access and use issues that affect their interests.	✓		Pre-construction	
11.4	Entering into discussions with BC Parks and other affected stakeholders with respect to ancillary sites and the possible use of the Porteau ferry dock for barge loading purposes.	✓		Pre-construction	✓
11.5	Developing and implementing detailed mitigative measures, in association with BC Parks, to minimize potential impact to recreation features and amenities at Porteau Cove Provincial Park, Murrin Provincial Park, Shannon Falls Provincial Park and Brandywine Falls Provincial Park. Impacts to marine recreation at Porteau Cove will be mitigated through access management.		✓	Pre-construction and construction	✓
11.6	Adhering to the Letter of Agreement between MoT and MWLAP, dated January 2004, which discusses the responsibilities and commitments specific to parks and other related features and services impacted by the highway improvements.				
11.7	Developing and implementing detailed mitigative measures in association with the District of West Vancouver to minimize potential impact to recreational features and amenities at Nelson Canyon Park.		✓	Pre-construction	
11.8	Adding to the construction drawing package showing all site-specific and temporary mitigative measures to be implemented during construction. Temporary measures may include re-routing sections of trails and providing alternate access routes, staging areas or scenic viewpoints.		✓	Pre-construction	✓
11.9	Requiring the Contractor to comply with contract documents for construction to minimize encroachment or other impact to recreation trails, trailheads, staging areas and related amenities or features.	✓		Construction	
11.10	Implementing a communication strategy specific to recreation users to address potential site specific access and use issues.		✓	Construction	

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
12.	***Archaeology and Heritage*** *MoT will mitigate the potential impacts to archaeology, culture and heritage by:*				
12.1	Adding to the construction drawing package, polygons showing areas with archaeological or heritage potential, including areas containing culturally modified trees in proximity to the project corridor as identified in **Volume 3 Section G: Culture and Heritage**. Site specific mitigative measures, if required, will be detailed on drawings and the requirements explained in contract Special Provisions for construction. The drawings and contract Special Provisions will be referred to the Archaeology and Registry Services Branch and First Nations for their review.		✓	Pre-construction	✓
12.2	Consulting with the First Nations regarding the three trails identified as areas of concern to the Squamish Nation in **Volume 3 Section G: Culture and Heritage** and facilitating discussions between the Squamish, other concerned First Nations, and other Ministries or provincial government agents regarding the management of the trails.	✓		Pre-construction	
12.3	Facilitating discussion between the Province and the First Nations to identify steps that can be taken by BC Parks to protect the pictograph site in Murrin Provincial Park from impacts from rock climbing and vandalism.	✓		Pre-construction	✓
12.4	Consulting with First Nations if post-1846 heritage resources are to be impacted, including but not limited to culturally modified trees at upper Larsen Creek, Montizambert Creek, Bertram Creek, Cheakamus River, and south of Rubble Creek. Provisions will be made for any impacted CMTs to be provided to First Nations for cultural purposes.		✓	Pre-construction	
12.5	Where highway widening provides improved access to a site of known archaeological or historical significance, working cooperatively with the First Nation(s) that have an interest in the site, as well as the responsible government agencies, to develop measures to minimize impacts related to over use and/or vandalism.		✓	Pre-construction	✓
12.6	Exploring options to protect sites of known archaeological , historical or cultural significance from project related impacts. This will include consulting with First Nations on management of Site DiRt-13, an aboriginal rock carving, including such measures as excluding any land-altering developments from the immediate vicinity of the petroglyph or placement of a barrier to protect the site.	✓		Pre-construction	✓
12.7	Continuing to consult with First Nations on issues as identified by them, and ensure that, wherever feasible, adverse impacts are avoided or mitigated.	✓		Pre-construction	

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
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12.8	Avoiding CMTs where feasible. However, if avoidance is not possible, First Nations will be consulted and the affected CMT(s) will be dated using an increment borer to determine if the trees predate 1846 and require an alteration permit from Archaeology and Registry Services Branch. Regardless of whether a permit is required or not, the affected culturally modified tree will be recorded, photographed and stem round segments obtained, analysed and dated Provisions will be made for any impacted CMTs to be provided to First Nations for cultural purposes.			Construction	✓
12.9	If, during the course of the project any items of archaeological, heritage or historical interest are found in the project area, requiring the Contractor to immediately cease operations in the affected area and minimize activities that create ground disturbance in and adjacent to the affected area, in compliance with, or using means equivalent to, those described in Section 165. Archaeology and Registry Services Branch, Department of Canadian Heritage (if within IR24) and First Nations representatives to the Project will be notified, and work within 30 m of the discovery site (or larger buffer area if human remains are encountered) will not resume until an appropriate directive has been received from representatives of those agencies after consultation with First Nations.			Construction	✓
12.10	Retaining an archaeology monitor during the route clearing and preparation stage to examine the area at Function Junction identified by the archaeology consultants as having potential for containing buried archaeological remains. If archaeological sites are encountered, mitigative measures, including, for example, installing drainage or erosion control, applying slope measures, erecting fences or other suitable barriers to protect sites, or establishing a buffer zone in which no land alteration or other activity is permitted will be applied. A systematic data recovery program would only be undertaken as a mitigative measure if avoidance were not possible. If avoidance is not possible, appropriate permit(s) will be obtained prior to impacting the site(s).			Construction	✓
12.11	Retaining a First Nations representative to act in the capacity of a Cultural and Heritage Advisor to liaise with the MoT and Contractor in providing input related to potential impact/interference with archaeological and/or cultural interests. It is anticipated that the representative will be on site at appropriate intervals during site preparation and construction.			Construction	
12.12	Working with the Lil'Wat Nation to maintain Lil'Wat access to culturally modified tree sites near Rubble Creek.			Pre-construction	
12.13	Ongoing liaison with First Nations throughout planning and design phase to provide design information that may necessitate additional archaeological assessment.			Pre-construction	

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13.	***Navigable Waters*** *MoT will mitigate the potential impacts to navigable waters by:*				
13.1	Obtaining final determination of navigability from the Coast Guard for crossings affected by the Project and for the proposed barge loading site at Sunset Marina.		✓	Pre-construction	✓
13.2	Liaising with the Coast Guard, Harbours Board and known mariners, as required, regarding referral process requirements for proposed temporary works, facilities and equipment.		✓	Pre-construction	✓
14.	***Public Safety*** *MoT will:*				
14.1	Develop an Operations and Incident Response Plan for the tunnel and approaches if the tunnel option is selected for construction. This Plan will be similar to those that exist for the Cassiar and George Massey Tunnels but will be tailored to suit the unique conditions at this tunnel. Mechanical, electrical, fire suppression and CCTV monitoring systems, if required for this tunnel application, will be monitored by control center operators. In the event of an incident, such as fire, accident or dangerous goods spill, the nature and location of the incident will be confirmed. Notifications and response will then be systematically implemented in accordance with pre-determined plans.		✓	Pre-construction	

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
15.	***Aesthetics*** *MoT will enhance the aesthetic attributes of the highway corridor by:*				
15.1	Consulting with the communities to develop design treatments that achieve aesthetic continuity and coherence along the highway corridor and incorporate these measures into designs so that the visual quality of the corridor and the corresponding aesthetic experience of those using the corridor is enhanced.	✓		Pre-construction	
15.2	Conducting further visual quality assessment as required to refine the list of important landscape features and to determine precisely how and if their use should be promoted.	✓		Pre-construction	
15.3	Undertaking a corridor-wide review of scenic viewpoints and pullouts to ensure an appropriate distribution of such amenities, while taking into account traffic safety considerations, site servicing, community and recreation interests.	✓		Pre-construction	
15.4	Developing and/or upgrading existing roadside facilities in partnership with the private sector, community groups, and various government agencies.		✓		
15.5	Developing aesthetic design treatment to maintain driver interest and attentiveness and thereby encourage safe driving.		✓	Pre-construction	
15.6	Providing aesthetic unity and character for the entire corridor, while respecting and reflecting the unique landscape character, culture, and ecology.		✓	Pre-construction	
15.7	Commissioning a landscape design consultant to work closely with the District of Squamish on the urban Squamish section of the highway improvements, and with the Squamish Nation on Stawamus IR#24.		✓	Pre-construction	

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
16.	***Property Acquisition*** *MoT will mitigate the potential impacts to owners and users from property requirements by:*				
16.1	Negotiating with BC Parks regarding compensation for property requirements at Murrin Provincial Park, Shannon Falls Provincial Park and Brandywine Falls Provincial Park (a change in Park boundaries at Brandywine Falls Provincial Park requires cabinet approval), including consideration of any private contractor impacts.	✓		Pre-construction	✓
16.2	Negotiating with the District of West Vancouver regarding property requirements due to potential encroachment of Nelson Canyon Park.	✓		Pre-construction	
16.3	Initiating offers and negotiating with private property owners to acquire lands,.	✓		Pre-construction	
16.4	Following MoT's process to ultimately register a Survey Plan of Road at the Crown Land Registry.	✓		Pre-construction	
16.5	Minimizing property acquisition requirements whenever possible.	✓		Pre-construction	

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
17.	**Public Information Sharing and Consultation**				
	The Ministry will:				
17.1	Maintain local dialogue			Post-Certification	
17.2	Conduct regular meetings between Owner's Engineer and TLC/CAGs	✓			
17.3	Conduct regular meetings with corridor elected officials and key stakeholder groups	✓			
17.4	Establish project liaison office in central location to facilitate local access and maintain a presence in the corridor.	✓			
17.5	Conduct open houses at key stages, by community.	✓			
17.6	Maintain broad public access to information, particularly in construction phases	✓			
17.7	Update website	✓			
17.8	Advertise project information as necessary	✓			
17.9	Maintain project liaison office: reporting project activity is key role of liaison function during construction, along with "customer service" function of fielding and following up on questions and complaints.	✓			
17.10	Communicating with the affected communities on a regular basis to advise them in advance of the types of activities that will be taking place and to notify them of changes in the estimated start and/or completion dates for the various construction phases.	✓			

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18	**First Nations** Relevant commitments that result from ongoing discussions between the province and the First Nations and are not captured herein, will be included in other forms of documentation agreeable to the First Nations.				
18.1	**Squamish Nation IR 24** MoT is committed to working cooperatively with the Squamish Nation, and other government agencies as appropriate, for a timely grant of the permit authorizing the use of the lands through IR 24 and subsequent transfer. The parties will work cooperatively towards this end as per the terms of the March 2004 AiP.	✓			
18.2	**Noise:**				
	– Additional analysis of noise issues will be undertaken with the Squamish Nation once the physical characteristics of the alignment are better known. The MoT will consider viable options for mitigation in consultation with Squamish Nation.	✓			
	– Construction contractors will be required to monitor noise at key locations to permit comparison with objectives.		✓		
18.3	**Safety:**				
	– The MoT will work closely with Squamish First Nation to identify and mitigate potential impacts related to intra-community barriers within IR#24.	✓			
18.4	**Culturally Significant Sites / Interests:**				
	– The MoT has committed to further exploring options/opportunities to protect identified sites from impacts where highway improvements may provide increased access.	✓			
	– The MoT will continue to consult with First Nations regarding the protection of important plant harvesting areas and will work towards identifying appropriate land protection, harvesting, relocation, or replanting measures.	✓			
	– The MoT will continue to consult with the Squamish Nation to identify locations where culturally significant rock formations may be potentially impacted by construction activities. Where feasible, the MoT will work cooperatively with the Squamish Nation to establish appropriate measures for this rock to be safely collected by the Squamish Nation.	✓			
	– During construction, the MoT will consult with the Squamish and Lil'Wat Nations if any of the previously identified cedar groves will be impacted/harvested during construction. If impacts to these cedars is unavoidable the method of harvesting and cutting into lengths for provisions to First Nations will be mutually agreed upon by the Province and First Nations.				
	– MoT to continue to consult with the Squamish Nation regarding the potential for minimizing rock blasting through Murrin Park.	✓			
	– The MoT will consult with the Lil'Wat Nation regarding any environmental rehabilitation plans within their territory to ensure their cultural interests are incorporated, as appropriate.	✓			

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		MoT	Contractor		
18.5	**Signage:** – MoT will continue to consult with the First Nations to develop appropriate forms and locations of signs in the First Nations' language for naming. MoT will work with the First Nations to develop and install displays that recognize culturally significant sites. Sign and display wording will be jointly developed. – MoT to work with the Squamish Nation to develop wording and select a location for a memorial plaque to be placed at M Creek. MoT will work with the Squamish Nation to provide safe access for related ceremonial activities.	✓ ✓			

NO.	COMMITMENTS AND RESPONSIBILITIES	ACTION BY		PROJECT STAGE	AGENCY REVIEW
		MoT	Contractor		
19.	***Federal Department, Provincial Agency, and Local Government*** *MoT will:*				
19.1	Continue to consult with government agencies on an individual basis post-certification as further detailed in this table. During this period, detailed design plans at environmentally sensitive sites will be referred to the agencies, mitigation and compensation designs will be finalized, and permits and authorizations from these agencies will be secured.		✓	Pre-construction	
19.2	Continue to consult with government agencies on an ongoing basis, including on-site meetings to ensure compliance with best practices and permits and approvals as further detailed in this table.		✓	Construction	